

California High-Speed Train Project



Request for Proposal for Design-Build Services

RFP No.: HSR 11-16
Geotechnical Exploration Data Report
Volume 2
Clinton Ave to Herndon Canal

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

THIS PAGE INTENTIONALLY LEFT BLANK

CALIFORNIA HIGH-SPEED TRAIN

Engineering Report

Procurement Package 1

Geotechnical Exploration Data Volume 2 of 2

June 1, 2012



CALIFORNIA
High-Speed Rail Authority



U.S. Department of Transportation
Federal Railroad Administration



CALIFORNIA HIGH-SPEED TRAIN PROJECT



PROCUREMENT PACKAGE 1

GEOTECHNICAL EXPLORATION DATA

Volume 2 of 2



For

AECOM

2020 L Street, Suite 300
Sacramento CA, 95811



PARIKH CONSULTANTS, INC.

2360 Qume Drive, Suite A, San Jose, CA 95131
(408) 452-9000

June 1, 2012

Job No. 2009-138-450 CP1

TABLE OF CONTENTS

Volume 1 of 2

1. PROJECT DESCRIPTION	1
2. PURPOSE OF THE GEOTECHNICAL EXPLORATION	2
3.0 FIELD EXPLORATION.....	2
3.1 Exploratory Boreholes	3
3.2 Cone Penetration Test (CPT)	3
3.3 Downhole Geophysical Logging	4
3.4 Installation of Standpipe Piezometers	4
4.0 LABORATORY TESTING	5
5.0 LIMITATIONS	5

Project Location Plan

Plate No:1

Summary of Geotechnical Exploration and Exploration Location Plan

Plate No:2

APPENDICES

Appendix A	Field Explorations
Appendix A-1	Log of Test Boring
Appendix A-2	Cone Penetration Test Results
Appendix A-3	Downhole Geophysical Measurements Report
Appendix B	Laboratory Test Data

Volume 2 of 2

Appendix C	PARIKH Consultants, Inc. Summary of Geotechnical Data
Appendix D	URS/HMM/Arup Joint Venture (URS) Geotechnical Data



APPENDIX C

PARIKH CONSULTANTS, INC.

SUMMARY OF GEOTECHNICAL DATA (Field & Laboratory Data Only)

(Part of Volume 2 of 2)

PARIKH CONSULTANTS, INC.¹
SUMMARY OF GEOTECHNICAL DATA (Field & Laboratory Data only)
CLINTON AVENUE TO HERNDON CANAL, FRESNO, CALIFORNIA
CALIFORNIA HIGH-SPEED TRAIN PROJECT

A geotechnical investigation was performed by PARIKH Consultants, Inc. (PCI) for the approximately 5 miles of CHST track from Clinton Avenue to Herndon Canal in Fresno, California. The Veterans Boulevard Interchange location was excluded from this study. This interchange location is included in a separate study that is from Veterans Boulevard to Avenue 17. The field exploration program consisted of nine (9) soil borings to depths of approximately 31.5 to 121.5 feet below existing ground surface (BGS) and one (1) seismic cone penetration test (SCPT) to a depth of 75 feet BGS. A summary of geotechnical data from this investigation is presented in the subsequent sections. The purpose of this summary is to present the geotechnical data all in one place for easy reference. ***Refer to the Geotechnical Data Report (GDR) dated February 22, 2012 by PCI for more details.***

Based on the Geotechnical Data Report dated February 22, 2012 by PCI, from Clinton Avenue to Herndon Canal in Fresno, the CHST will be all at-grade with several new or reconstructed roadway overcrossing/overhead structures. A CHST structure will be required at Herndon Canal crossing. The SR 99 freeway will be relocated about 100 feet west of its current alignment from Clinton to Ashlan Avenue, a distance of approximately 2 miles. The existing City of Fresno arterial street overcrossings of the UPRR and SR 99 will have to be modified for the CHST between Clinton and Ashlan Avenues.

The field exploration consisted of drilling 8 hollow stem auger and 1 rotary-wash boreholes and performing 1 Seismic Cone Penetration Test (SCPT). The geotechnical exploration program conducted for this study is detailed in the following table.

Summary of Geotechnical Exploration Program

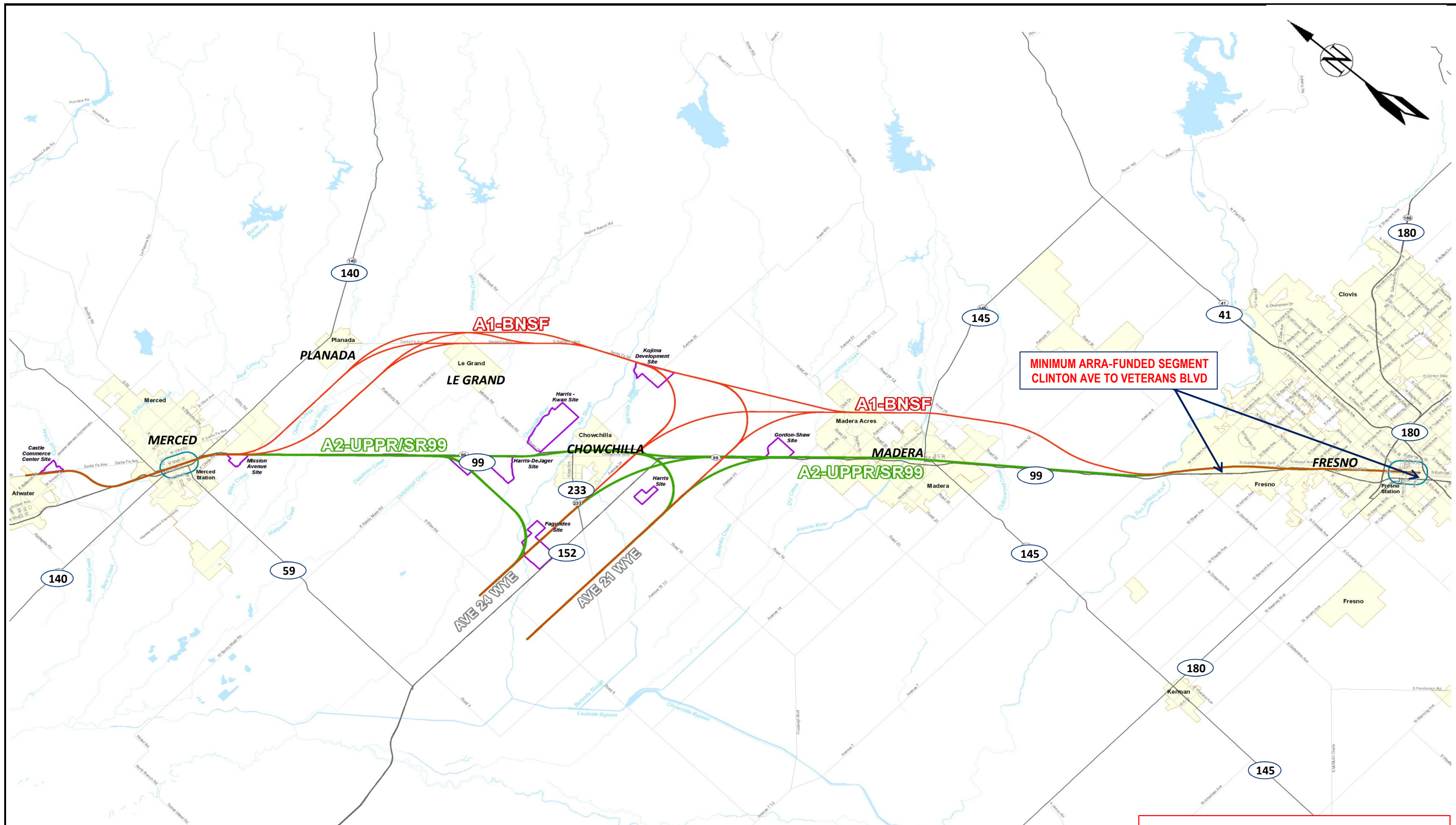
Boring ID	Project Element/Purposes	Exploration Type	Approximate Exploration Location	Exploration Depth (ft)
S0001A	Clinton Avenue Overcrossing Fresno Yard Overcrossing	Soil Boring	STA 2072+50	121.5
S0002A	CHST Track Study	Soil Boring	STA 2034+00	31.5
S0003A	CHST Track Study	Soil Boring	STA 2004+00	31.5
S0004CPT	Seismic Evaluation and Verification	Seismic CPT	STA 1967+50	75
S0005A	Ashlan Ave Overhead	Soil Boring	STA 1967+50	121.5
S0006A	CHST Track Study	Soil Boring	STA 1939+50	31.5
S0007A	CHST Track Study	Soil Boring	STA 1917+50	31.5
S0008A	Shaw Ave overcrossing	Soil Boring	STA 1894+50	121.5
S0009R	Herndon Canal Bridge	Soil Boring	STA 1858+50	111.5
S0010A	CHST Track Study	Soil Boring	STA 1834+00	31.5

¹ Reference document: California High-Speed Train Project, Clinton Avenue to Herndon Canal Geotechnical Data Report dated February 2012, prepared by PARIKH Consultants, Inc.

The GDR by PARIKH has been distributed to proper parties by the California High-Speed Rail Authority. The geotechnical data from the field exploration and laboratory test results are attached for easy reference. All descriptions and appendices attached are from the GDR dated February 22, 2012 by PARIKH. It should be recognized that the GDR must be read in its entirety for a comprehensive understanding of the project and findings of the investigation.

ATTACHMENTS:

1. PROJECT LOCATION PLAN
2. EXPLORATION LOCATION PLAN
3. LOG OF TEST BORINGS (PARIKH 2011)
4. CONE PENETRATION TEST (CPT) REPORT
5. LABORATORY TEST DATA



PROJECT LOCATION MAP

10 MILES

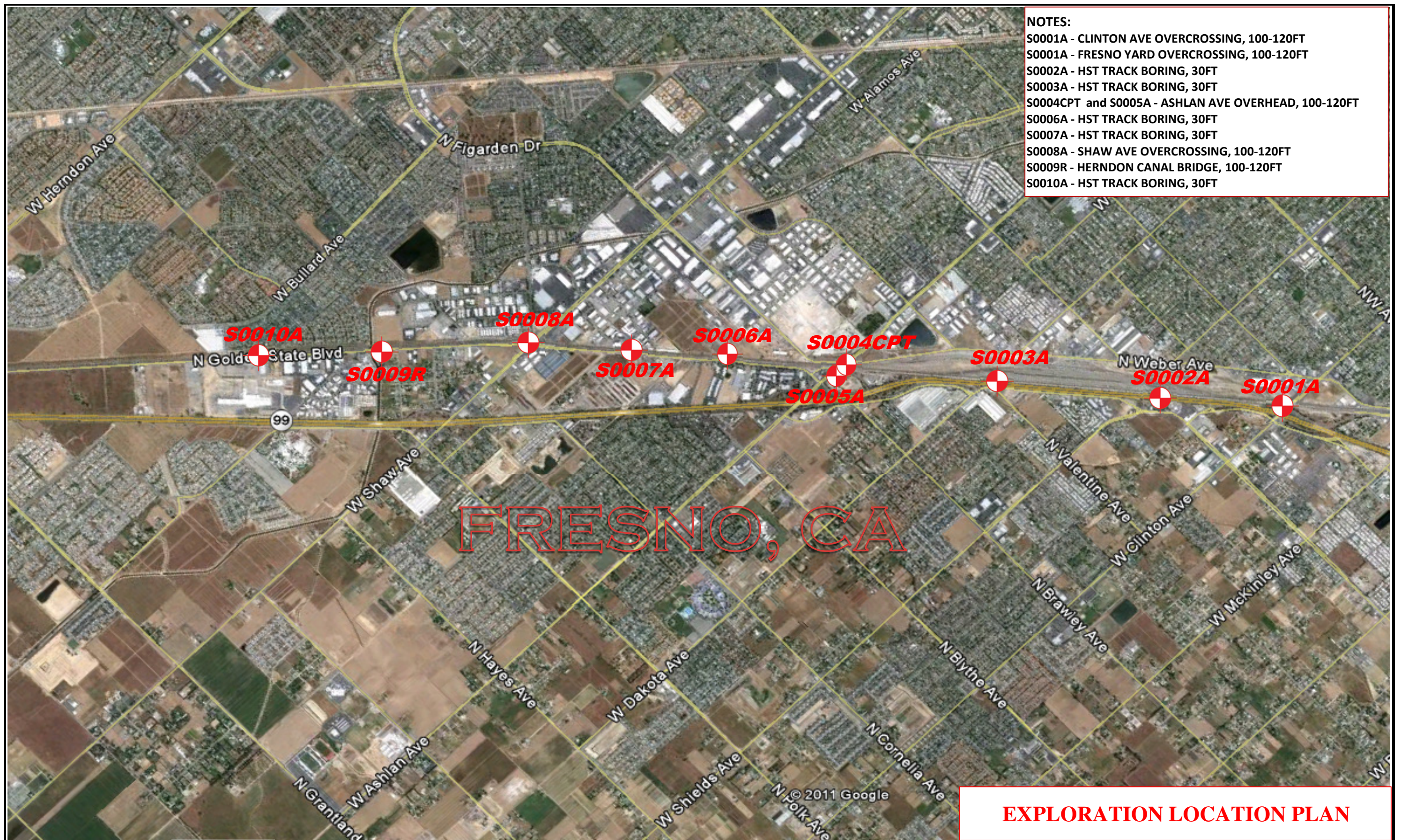


PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS TESTING

MINIMUM ARRA-FUNDED SEGMENT
MERCED TO FRESNO SECTION OF THE
CALIFORNIA HIGH-SPEED TRAIN PROJECT

JOB NO.: 2009-138-400

PLATE NO.: 1



- NOTES:
- S0001A - CLINTON AVE OVERCROSSING, 100-120FT
 - S0001A - FRESNO YARD OVERCROSSING, 100-120FT
 - S0002A - HST TRACK BORING, 30FT
 - S0003A - HST TRACK BORING, 30FT
 - S0004CPT and S0005A - ASHLAN AVE OVERHEAD, 100-120FT
 - S0006A - HST TRACK BORING, 30FT
 - S0007A - HST TRACK BORING, 30FT
 - S0008A - SHAW AVE OVERCROSSING, 100-120FT
 - S0009R - HERNDON CANAL BRIDGE, 100-120FT
 - S0010A - HST TRACK BORING, 30FT

EXPLORATION LOCATION PLAN

LEGEND

 Approximate Exploration Location



1.0 mile



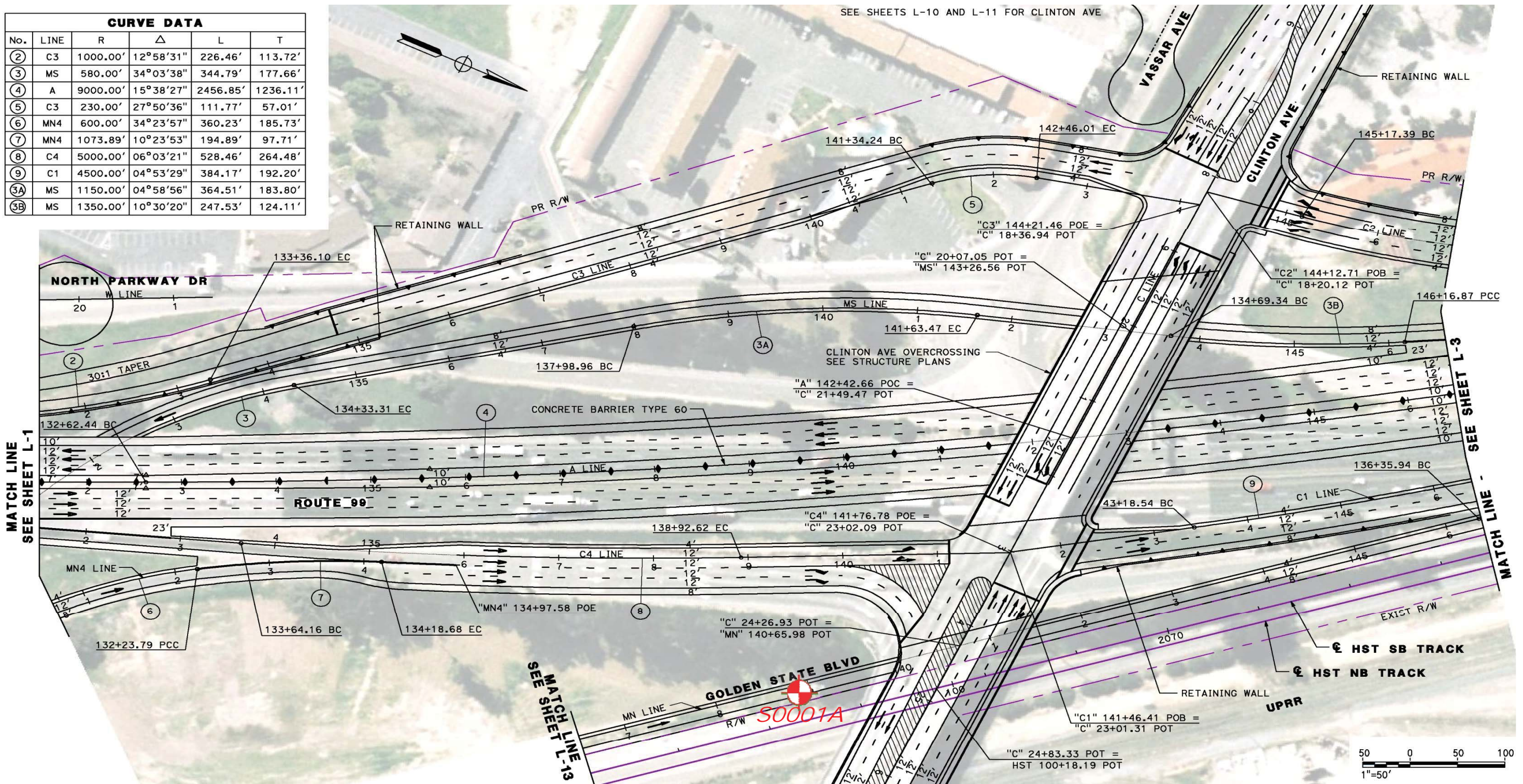
PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS TESTING

MINIMUM ARRA-FUNDED SEGMENT
MERCED TO FRESNO SECTION OF THE
CALIFORNIA HIGH-SPEED TRAIN PROJECT

JOB NO.: 2009-138-400

PLATE NO.: 2-0

CURVE DATA					
No.	LINE	R	Δ	L	T
②	C3	1000.00'	12°58'31"	226.46'	113.72'
③	MS	580.00'	34°03'38"	344.79'	177.66'
④	A	9000.00'	15°38'27"	2456.85'	1236.11'
⑤	C3	230.00'	27°50'36"	111.77'	57.01'
⑥	MN4	600.00'	34°23'57"	360.23'	185.73'
⑦	MN4	1073.89'	10°23'53"	194.89'	97.71'
⑧	C4	5000.00'	06°03'21"	528.46'	264.48'
⑨	C1	4500.00'	04°53'29"	384.17'	192.20'
③A	MS	1150.00'	04°58'56"	364.51'	183.80'
③B	MS	1350.00'	10°30'20"	247.53'	124.11'



EXPLORATION LOCATION PLAN



NOTES: THIS EXPLORATION LOCATION PLAN WAS MODIFIED FROM THE RECORD SET 15% DESIGN SUBMITTAL BY AECOM AND CH2MHILL DATED APRIL 29, 2011.

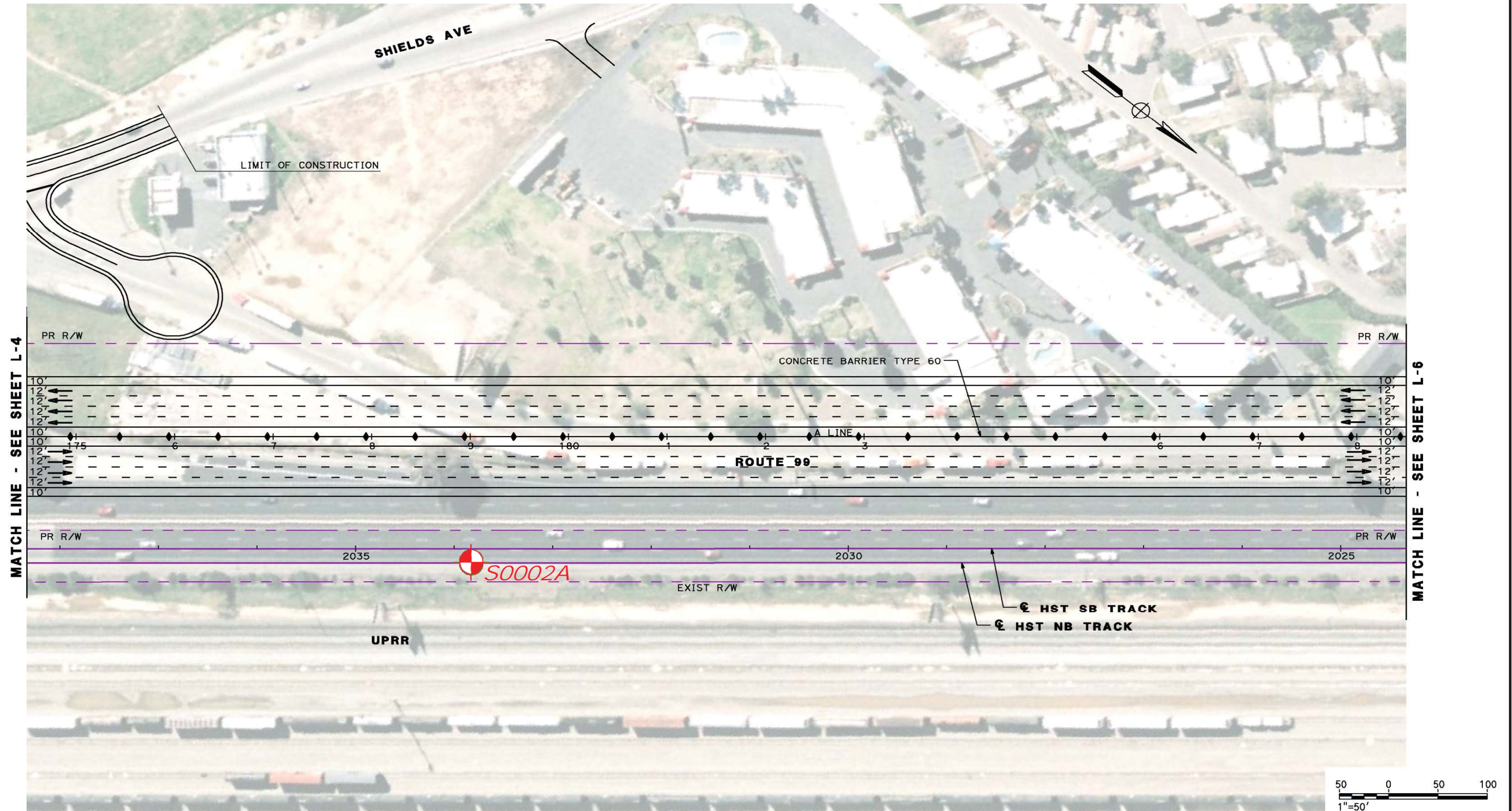


PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS TESTING

MINIMUM ARRA-FUNDED SEGMENT
MERCED TO FRESNO SECTION OF THE
CALIFORNIA HIGH SPEED TRAIN PROJECT

JOB NO.: 2009-138-400

PLATE NO.: 2-1



EXPLORATION LOCATION PLAN



NOTES: THIS EXPLORATION LOCATION PLAN WAS MODIFIED FROM THE RECORD SET 15% DESIGN SUBMITTAL BY AECOM AND CH2MHILL DATED APRIL 29, 2011.



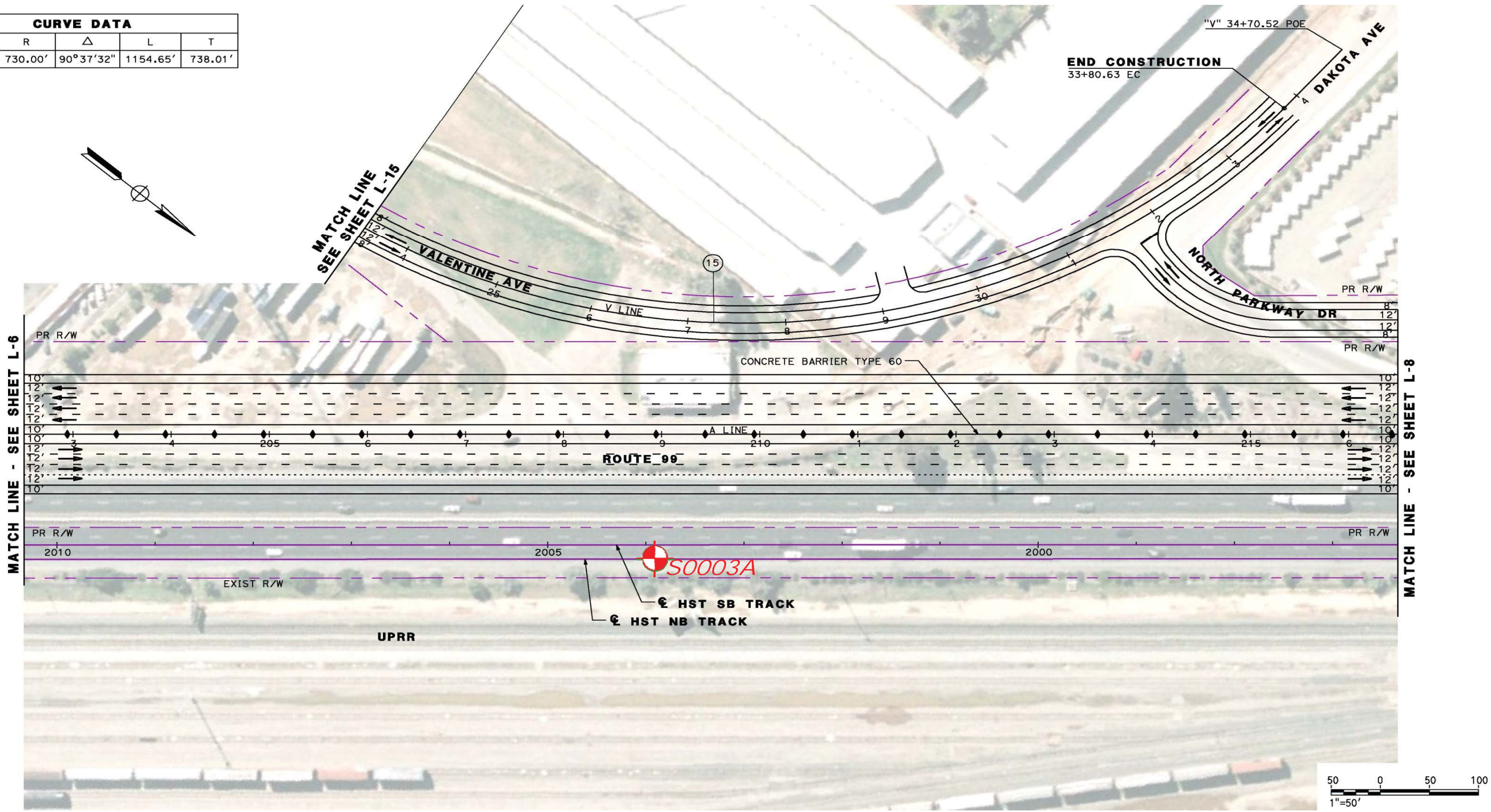
PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS TESTING

MINIMUM ARRA-FUNDED SEGMENT
MERCED TO FRESNO SECTION OF THE
CALIFORNIA HIGH SPEED TRAIN PROJECT

JOB NO.: 2009-138-400

PLATE NO.: 2-2

CURVE DATA					
No.	LINE	R	Δ	L	T
15	V	730.00'	90°37'32"	1154.65'	738.01'



EXPLORATION LOCATION PLAN

LEGEND

 Approximate Exploration Location

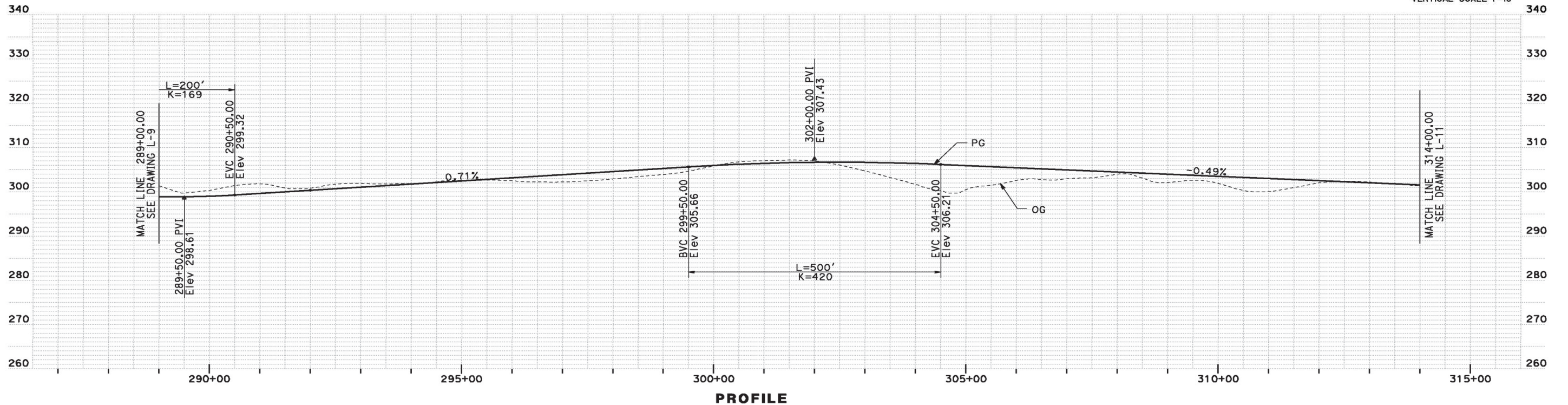
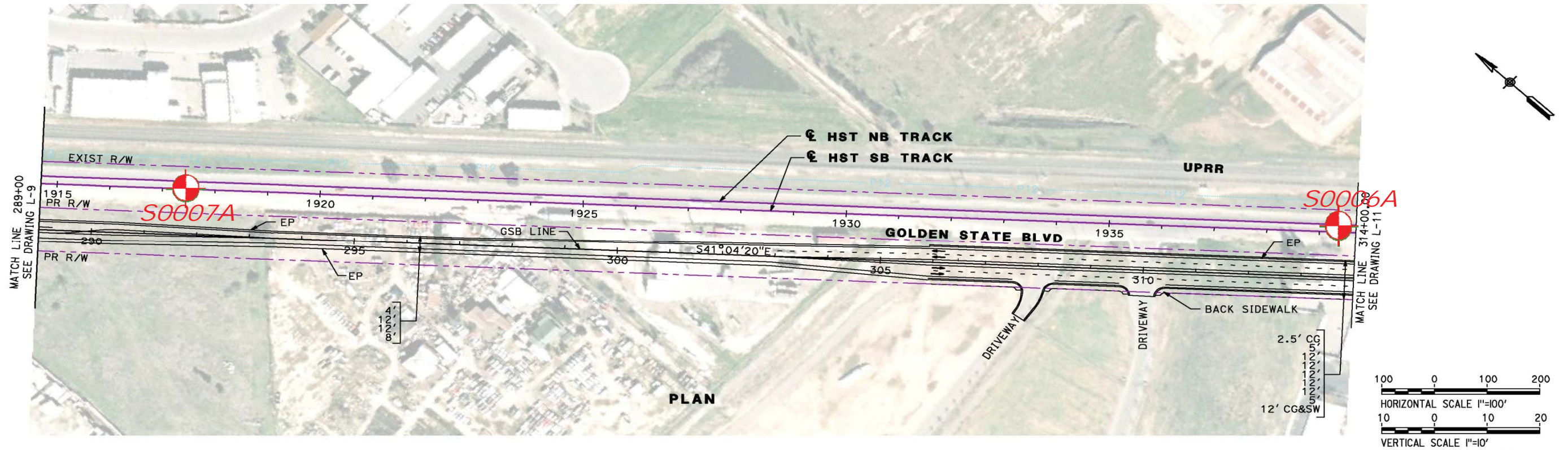
NOTES: THIS EXPLORATION LOCATION PLAN WAS MODIFIED FROM THE RECORD SET 15% DESIGN SUBMITTAL BY AECOM AND CH2MHILL DATED APRIL 29, 2011.



PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS TESTING

MINIMUM ARRA-FUNDED SEGMENT
MERCED TO FRESNO SECTION OF THE
CALIFORNIA HIGH SPEED TRAIN PROJECT

JOB NO.: 2009-138-400 PLATE NO.: 2-3



EXPLORATION LOCATION PLAN



NOTES: THIS EXPLORATION LOCATION PLAN WAS MODIFIED FROM THE RECORD SET 15% DESIGN SUBMITTAL BY AECOM AND CH2MHILL DATED APRIL 29, 2011.



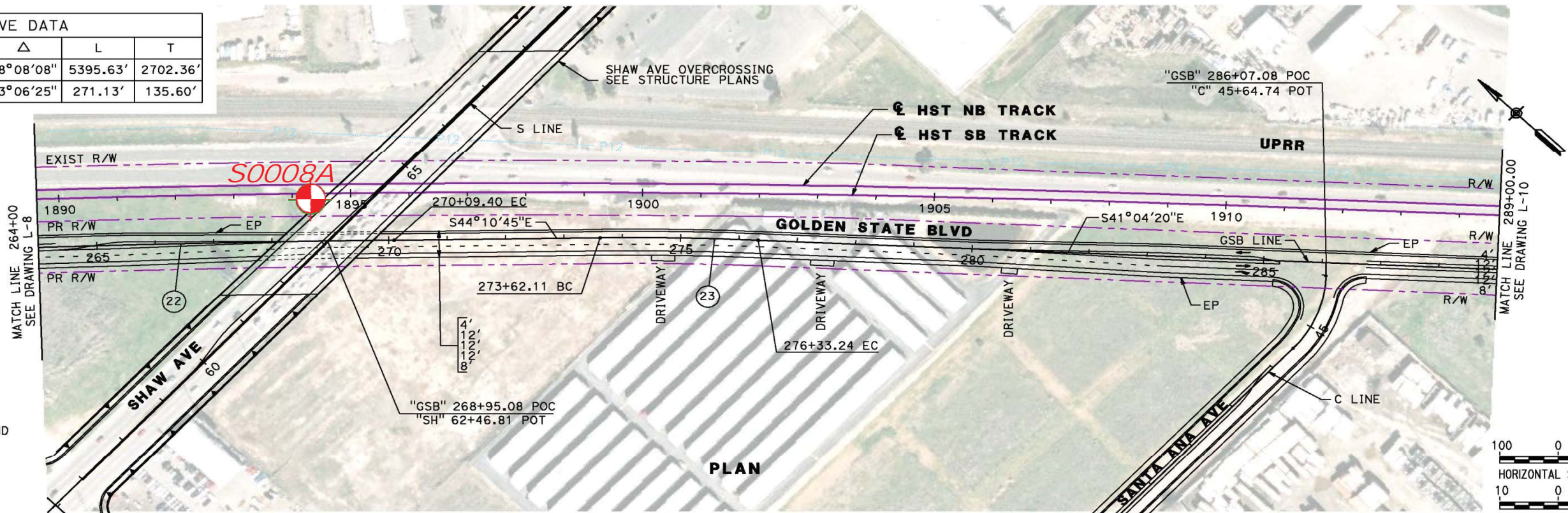
PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS TESTING

MINIMUM ARRA-FUNDED SEGMENT
MERCED TO FRESNO SECTION OF THE
CALIFORNIA HIGH SPEED TRAIN PROJECT

JOB NO.: 2009-138-400

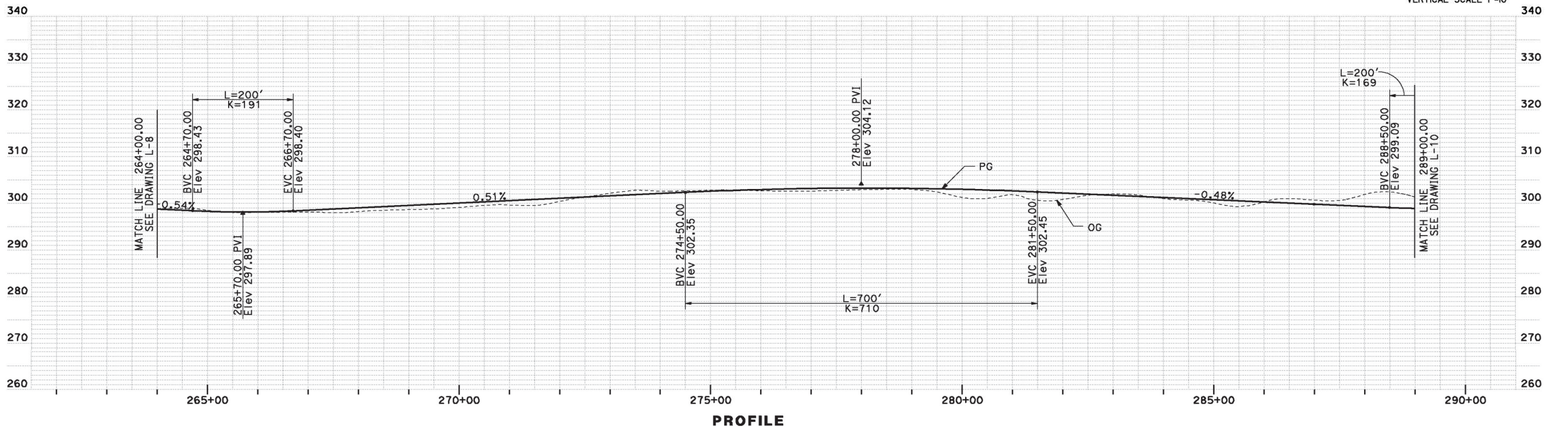
PLATE NO.: 2-5

CURVE DATA					
No.	LINE	R	Δ	L	T
22	GSB	38000.00'	08°08'08"	5395.63'	2702.36'
23	GSB	5000.00'	03°06'25"	271.13'	135.60'



SEE SHEETS L-14 AND L-15 FOR SHAW AVE

SEE SHEETS L-16 AND L-17 FOR CORNELIA AND SANTA ANA AVE



EXPLORATION LOCATION PLAN

LEGEND

Approximate Exploration Location

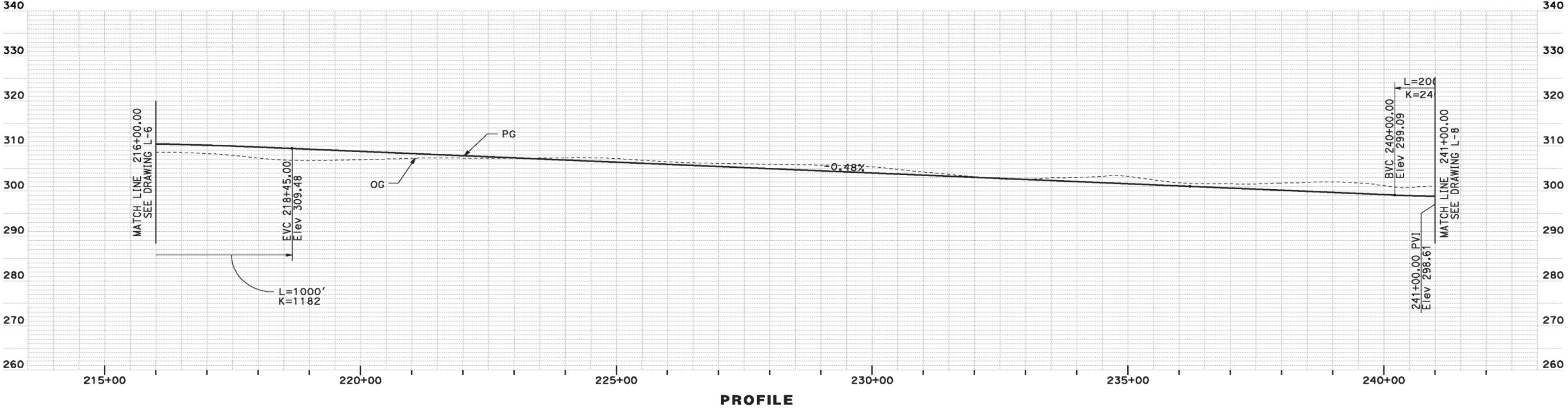
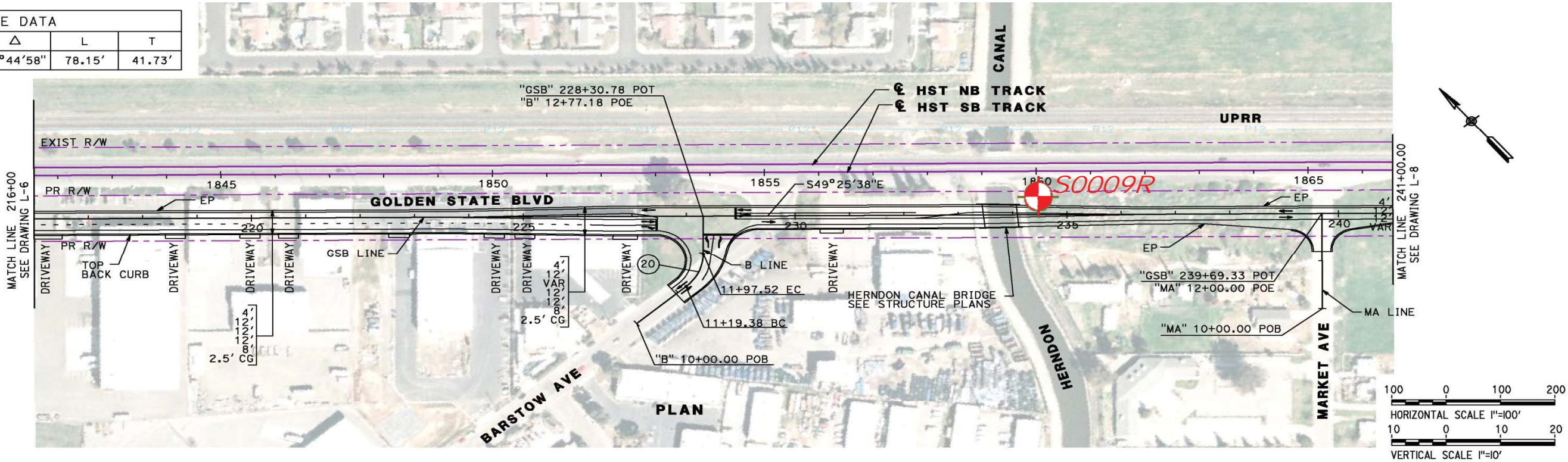
NOTES: THIS EXPLORATION LOCATION PLAN WAS MODIFIED FROM THE RECORD SET 15% DESIGN SUBMITTAL BY AECOM AND CH2MHILL DATED APRIL 29, 2011.



PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS TESTING

MINIMUM ARRA-FUNDED SEGMENT MERCED TO FRESNO SECTION OF THE CALIFORNIA HIGH SPEED TRAIN PROJECT	
JOB NO.: 2009-138-400	PLATE NO.: 2-6

CURVE DATA					
No.	LINE	R	Δ	L	T
20	B	90.00'	49°44'58"	78.15'	41.73'



EXPLORATION LOCATION PLAN

LEGEND

Approximate Exploration Location

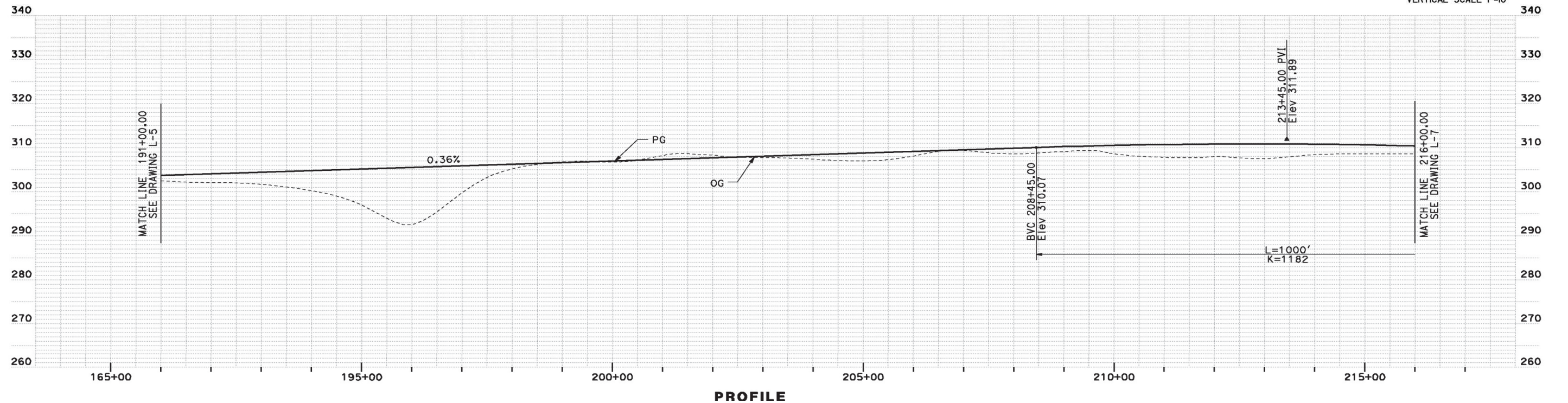
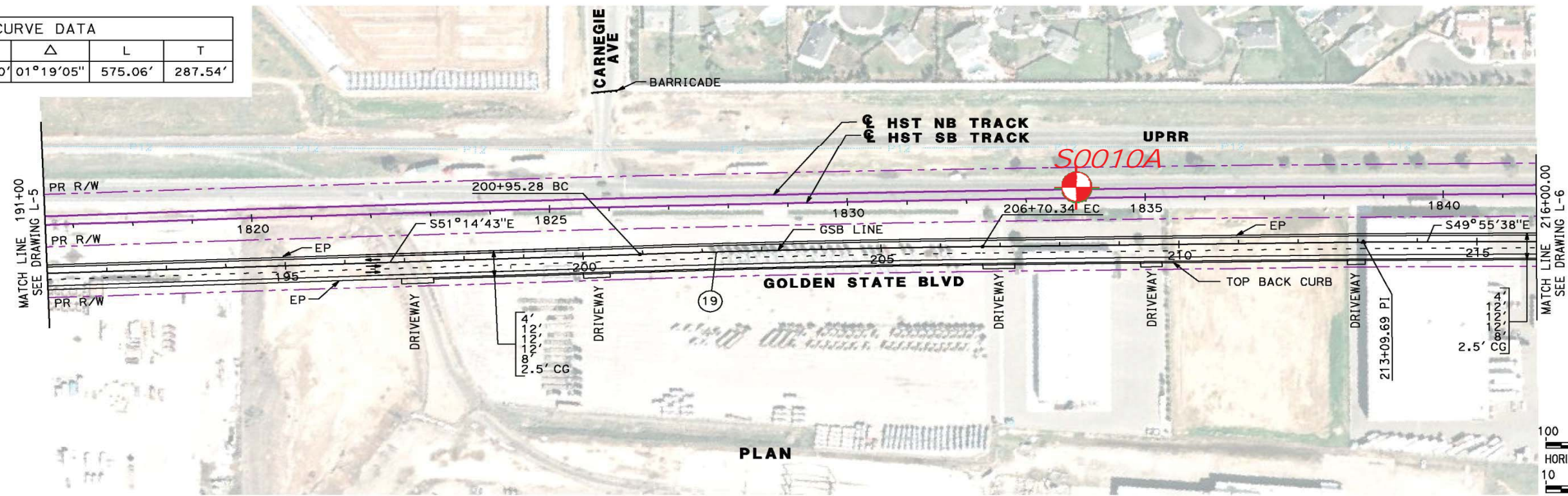
NOTES: THIS EXPLORATION LOCATION PLAN WAS MODIFIED FROM THE RECORD SET 15% DESIGN SUBMITTAL BY AECOM AND CH2MHILL DATED APRIL 29, 2011.



PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS TESTING

MINIMUM ARRA-FUNDED SEGMENT MERCED TO FRESNO SECTION OF THE CALIFORNIA HIGH SPEED TRAIN PROJECT	
JOB NO.: 2009-138-400	PLATE NO.: 2-7

CURVE DATA					
No.	LINE	R	Δ	L	T
19	GSB	25000.00'	01°19'05"	575.06'	287.54'



EXPLORATION LOCATION PLAN

LEGEND

Approximate
Exploration Location

NOTES: THIS EXPLORATION LOCATION PLAN WAS MODIFIED FROM THE RECORD SET 15% DESIGN SUBMITTAL BY AECOM AND CH2MHILL DATED APRIL 29, 2011.



PARIKH CONSULTANTS, INC.

GEOTECHNICAL CONSULTANTS

MATERIALS TESTING

MINIMUM ARRA-FUNDED SEGMENT

MERCED TO FRESNO SECTION OF THE

CALIFORNIA HIGH SPEED TRAIN PROJECT

JOB NO.: 2009-138-400

PLATE NO.: 2-8

GROUP SYMBOLS AND NAMES

Graphic / Symbol	Group Names	Graphic / Symbol	Group Names
	GW Well-graded GRAVEL Well-graded GRAVEL with SAND		CL Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
	GP Poorly graded GRAVEL Poorly graded GRAVEL with SAND		CL-ML SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
	GW-GM Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND		ML SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
	GW-GC Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		OL ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
	GP-GM Poorly graded GRAVEL with SILT Poorly graded GRAVEL with SILT and SAND		OL ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
	GP-GC Poorly graded GRAVEL with CLAY (or SILTY CLAY) Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		CH Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
	GM Silty GRAVEL Silty GRAVEL with SAND		MH Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
	GC CLAYEY GRAVEL CLAYEY GRAVEL with SAND		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY elastic ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	GC-GM Silty, CLAYEY GRAVEL Silty, CLAYEY GRAVEL with SAND		OL/OH ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND
	SW Well-graded SAND Well-graded SAND with GRAVEL		NX NX Rock Core
	SP Poorly graded SAND Poorly graded SAND with GRAVEL		HQ HQ Rock Core
	SW-SM Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL		Bulk Bulk Sample
	SW-SC Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		Other Other (see remarks)
	SP-SM Poorly graded SAND with SILT Poorly graded SAND with SILT and GRAVEL		
	SP-SC Poorly graded SAND with CLAY (or SILTY CLAY) Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		
	SM Silty SAND Silty SAND with GRAVEL		
	SC CLAYEY SAND CLAYEY SAND with GRAVEL		
	SC-SM Silty, CLAYEY SAND Silty, CLAYEY SAND with GRAVEL		
	PT PEAT		
	COBBLES COBBLES and BOULDERS BOULDERS		

FIELD AND LABORATORY TESTS

C	Consolidation (ASTM D 2435-04)
CL	Collapse Potential (ASTM D 5333-03)
CP	Compaction Curve (CTM 216 - 06)
CR	Corrosion, Sulfates, Chlorides (CTM 643 - 99; CTM 417 - 06; CTM 422 - 06)
CU	Consolidated Undrained Triaxial (ASTM D 4767-02)
DS	Direct Shear (ASTM D 3080-04)
EI	Expansion Index (ASTM D 4829-03)
M	Moisture Content (ASTM D 2216-05)
OC	Organic Content (ASTM D 2974-07)
P	Permeability (CTM 220 - 05)
PA	Particle Size Analysis (ASTM D 422-63 [2002])
PI	Liquid Limit, Plastic Limit, Plasticity Index (AASHTO T 89-02, AASHTO T 90-00)
PL	Point Load Index (ASTM D 5731-05)
PM	Pressure Meter
PP	Pocket Penetrometer
R	R-Value (CTM 301 - 00)
SE	Sand Equivalent (CTM 217 - 99)
SG	Specific Gravity (AASHTO T 100-06)
SL	Shrinkage Limit (ASTM D 427-04)
SW	Swell Potential (ASTM D 4546-03)
TV	Pocket Torvane
UC	Unconfined Compression - Soil (ASTM D 2166-06) Unconfined Compression - Rock (ASTM D 2938-95)
UU	Unconsolidated Undrained Triaxial (ASTM D 2850-03)
UW	Unit Weight (ASTM D 4767-04)
VS	Vane Shear (AASHTO T 223-96 [2004])

SAMPLER GRAPHIC SYMBOLS

	Standard Penetration Test (SPT)
	Standard California Sampler
	Modified California Sampler
	Shelby Tube
	Piston Sampler
	NX Rock Core
	HQ Rock Core
	Bulk Sample
	Other (see remarks)

DRILLING METHOD SYMBOLS

	Auger Drilling		Rotary Drilling		Dynamic Cone or Hand Driven		Diamond Core
--	----------------	--	-----------------	--	-----------------------------	--	--------------

WATER LEVEL SYMBOLS

	First Water Level Reading (during drilling)
	Static Water Level Reading (short-term)
	Static Water Level Reading (long-term)



MINIMUM ARRA-FUNDED SEGMENT

Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-1A

CONSISTENCY OF COHESIVE SOILS

Descriptor	Unconfined Compressive Strength (tsf)	Pocket Penetrometer (tsf)	Torvane (tsf)	Field Approximation
Very Soft	< 0.25	< 0.25	< 0.12	Easily penetrated several inches by fist
Soft	0.25 - 0.50	0.25 - 0.50	0.12 - 0.25	Easily penetrated several inches by thumb
Medium Stiff	0.50 - 1.0	0.50 - 1.0	0.25 - 0.50	Can be penetrated several inches by thumb with moderate effort
Stiff	1.0 - 2.0	1.0 - 2.0	0.50 - 1.0	Readily indented by thumb but penetrated only with great effort
Very Stiff	2.0 - 4.0	2.0 - 4.0	1.0 - 2.0	Readily indented by thumbnail
Hard	> 4.0	> 4.0	> 2.0	Indented by thumbnail with difficulty

APPARENT DENSITY OF COHESIONLESS SOILS

Descriptor	SPT N_{60} - Value (blows / foot)
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

MOISTURE

Descriptor	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

PERCENT OR PROPORTION OF SOILS

Descriptor	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

SOIL PARTICLE SIZE

SOIL PARTICLE SIZE		
Descriptor		Size
Boulder		> 12 inches
Cobble		3 to 12 inches
Gravel	Coarse	3/4 inch to 3 inches
	Fine	No. 4 Sieve to 3/4 inch
Sand	Coarse	No. 10 Sieve to No. 4 Sieve
	Medium	No. 40 Sieve to No. 10 Sieve
	Fine	No. 200 Sieve to No. 40 Sieve
Silt and Clay		Passing No. 200 Sieve

PLASTICITY OF FINE-GRAINED SOILS

Descriptor	Criteria
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

CEMENTATION

Descriptor	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

NOTE: This legend sheet provides descriptors and associated criteria for required soil description components only.

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010).

**MINIMUM ARRA-FUNDED SEGMENT****Merced to Fresno Section of the California High-Speed Train Project,**

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.



Plate:

A-1B

LOGGED BY L.S. Bhangoor	BEGIN DATE 10-26-11	COMPLETION DATE 10-26-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 36° 46' 17" / -119° 50' 14"	HOLE ID S0001A
DRILLING CONTRACTOR Technicon Engineering Services, Inc.	BOREHOLE LOCATION (Offset, Station, Line) STA 2072+50		SURFACE ELEVATION	
DRILLING METHOD Hollow-Stem Auger	DRILL RIG CME 55		BOREHOLE DIAMETER 8 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) MC (2.5" I.D.) - SPT (1.4" I.D.)	SPT HAMMER TYPE 140 lbs		HAMMER EFFICIENCY, ERI 87%	
BOREHOLE BACKFILL AND COMPLETION NEAT CEMENT	GROUNDWATER READINGS	DURING DRILLING	AFTER DRILLING (DATE) 115.0 ft on 10-26-11	TOTAL DEPTH OF BORING 121.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
0	0		CLAYEY SAND (SC); very dense; light grayish brown; moist; mostly fine SAND; moderate cementation.												
1	1														
2	2		Trace fine GRAVEL; (+#4=2.1%, -#200=28.5%).												
3	3							2							PA
4	4		SILTY SAND (SM); very dense; light grayish brown; moist; mostly fine SAND; (+#4=2.1%, -#200=32.7%).												PA, R, CP (Bulk 2'-5')
5	5		SILTY SAND with GRAVEL (SM); loose; light grayish brown; moist; some fine GRAVEL; mostly fine SAND.												PA
6	6			X	S02	5 4 3	7	1			56				CR
7	7														
8	8														
9	9														
10	10		SILTY SAND (SM); medium dense; light yellowish brown; moist; mostly fine SAND; (-#200=17.4%).								67				PA
11	11			X	S03	3 6 7	13		1						
12	12														
13	13														
14	14														
15	15		Light grayish brown.												
16	16			X	S04	3 5 7	12	0			72				
17	17														
18	18														
19	19														
20	20														
21	21		Poorly graded SAND (SP); medium dense; light grayish brown; moist; mostly fine SAND; (+#4=0%, -#200=2.9%).								89				PA
22	22			X	S05	3 7 8	15		1						
23	23														
24	24														
25	25														

(continued)

 	MINIMUM ARRA-FUNDED SEGMENT Merced to Fresno Section of the California High-Speed Train Project,	
	Date: 10/26/2011	Job No.: 2009-138-400
This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.		Plate: A-2A

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
25	25		SANDY SILT (ML); stiff; light yellowish brown; moist; mostly fine SAND.	X	S06	13 27 28	55	3			83				
26	26														
27	27														
28	28		SILTY SAND (SM); dense; light grayish brown; moist; mostly fine SAND.												
29	29														
30	30		Dense.	X	S07	14 18 18	36	1			72				
31	31														
32	32														
33	33														
34	34														
35	35			X	S08	5 8 13	21	1			78				
36	36														
37	37														
38	38														
39	39		CLAYEY SAND (SC); dense; light brown; moist; mostly fine SAND.												
40	40		Very dense.	X	S09	25 33 50/2"	83/8				72				
41	41		SANDY SILT (ML); hard; light yellowish brown; moist; mostly fine SAND; (- #200=51.4%).					6							
42	42														
43	43														
44	44														
45	45			X	S10	39 60/5"	60/5				61				
46	46														
47	47														
48	48		SILTY SAND (SM); dense; olive gray; moist; mostly medium to fine SAND.												
49	49														
50	50			X	S11	8 22 29	51	1			72				
51	51														
52	52														
53	53		Lean CLAY with SAND (CL); hard; light grayish brown; moist; mostly fine SAND; low to medium plasticity fines.												
54	54														
55	55														

(continued)


MINIMUM ARRA-FUNDED SEGMENT
Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-2B

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
56			SILT (ML); hard; light grayish brown; moist; some fines. <i>layer description continued from previous page</i>		S12	6 25 63	88				72				PI, UU PI
57															
58															
59			CLAYEY SAND (SC); very dense; reddish black; moist; mostly fine SAND.												
60			(+ #4=0%, - #200=39.8%).		S13	19 60/5"	60/5				72				PA
61								9							
62															
63															
64															
65			SILTY SAND (SM); very dense; brown; moist; mostly fine SAND.		S14	23 60/3"	60/3	11	115		50				DS
66															
67															
68															
69															
70					S15	25 60/2"	60/2				44				CL
71															
72			SANDY lean CLAY (CL); hard; yellowish brown; moist; mostly fine SAND; low to medium plasticity fines.												
73															
74															
75			SILT (ML); hard; brown; moist; some SILT.		S16	5 12 15	27	14	93	PP = >4	67				
76															
77															
78															
79															
80			SILT with SAND (ML); hard; light grayish brown; moist; little fine SAND; mostly fines.		S17	9 22 33	55	20	97	PP = >4	83				
81															
82															
83															
84															
85															

(continued)


MINIMUM ARRA-FUNDED SEGMENT
Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-2C

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
86			SILT with SAND (ML) (continued).		S18	18 27 32	59				83				
87			SILTY SAND (SM); very dense; hard; brown; moist; mostly fine SAND; (-#200=34.8%).					7	103						PA
88															
89															
90					S19	25 44 60/3"	104/9	14	105		78				
91															
92															
93															
94			Yellowish brown; moist; some medium to fine SAND.												
95					S20	31 60/6"	60/6	14	91		56				
96															
97															
98															
99															
100			(+ #4=0%, -#200=26.4%).		S21	24 53 60/4"	113/10				78				PA
101								14	97						
102															
103			SILT (ML); hard; light grayish brown; moist.												
104															
105					S22	14 54 60/5"	114/11	25	96	PP = >4	72				
106															
107															
108															
109			SILTY SAND (SM); very dense; light brown; moist; mostly fine SAND.												
110			Dense; light olive brown.		S23	7 20 29	49	26	93		83				DS
111															
112															
113															
114															
115															

(continued)


MINIMUM ARRA-FUNDED SEGMENT
Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-2D

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
116			Very dense; yellowish brown; wet; mostly medium to fine SAND. SILTY SAND (SM) (<i>continued</i>). SILTY SAND (SM); very dense; light brown; moist; mostly fine SAND. <i>layer description continued from previous page</i>		S24	12	58	31	90		89				
117						27									
118						31									
119															
120			Lean CLAY (CL); hard; light brown; wet; low to medium plasticity fines.		S25	3	46				78				
121						19									
122						27									
123			Boring terminated at planned depth. Bottom of borehole at 121.5 ft bgs.												
124															
125															
126															
127															
128															
129															
130															
131															
132															
133															
134															
135															
136															
137															
138															
139															
140															
141															
142															
143															
144															
145															



MINIMUM ARRA-FUNDED SEGMENT

Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.



Plate:

A-2E

LOGGED BY L.S. Bhango	BEGIN DATE 10-31-11	COMPLETION DATE 10-31-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 36° 46' 48" / -119° 50' 46"	HOLE ID S0002A
DRILLING CONTRACTOR Technicon Engineering Services, Inc.	BOREHOLE LOCATION (Offset, Station, Line) STA 2034+00		SURFACE ELEVATION	
DRILLING METHOD Hollow-Stem Auger	DRILL RIG CME 55		BOREHOLE DIAMETER 8 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) MC (2.5" I.D.) - SPT (1.4" I.D.)	SPT HAMMER TYPE 140 lbs		HAMMER EFFICIENCY, ERI 87%	
BOREHOLE BACKFILL AND COMPLETION NEAT CEMENT	GROUNDWATER READINGS	DURING DRILLING Not encountered on 10-31-2011	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING 31.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
0	0		SILTY SAND (SM); dense; reddish brown; moist; mostly fine SAND; moderate to strong cementation.												
1	1														
2	2		(+ #4=0%, - #200=34.5%).		S01	7 9 13	22				72				PA
3	3							5	114						PA, CP, EI (Bulk 2'-5') PA
4	4		Trace fine GRAVEL; (+ #4=3.2%, - #200=34.3%).												
5	5		Very dense.		S02	10 19 35	54	8			83				CR
6	6														
7	7														
8	8														
9	9														
10	10				S03	3 9 16	25	11	116		100				DS
11	11		Medium dense; light reddish brown.												
12	12														
13	13														
14	14														
15	15				S04	3 7 9	16				89				PA
16	16		Poorly graded SAND with SILT (SP-SM); medium dense; light grayish brown; moist; mostly fine SAND; (+ #4=0%, - #200=6.8%).					10							
17	17														
18	18														
19	19														
20	20				S05	3 4 8	12	6			89				
21	21		Mostly coarse to medium SAND.												
22	22														
23	23														
24	24														
25	25														

(continued)

 	MINIMUM ARRA-FUNDED SEGMENT Merced to Fresno Section of the California High-Speed Train Project,	
	Date: 10/26/2011	Job No.: 2009-138-400
This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.		Plate: <div style="font-size: 24pt; font-weight: bold;">A-3A</div>

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
25	25		Poorly graded SAND with SILT (SP-SM) (<i>continued</i>).		S06	3	12				100				
26	26		Poorly graded SAND (SP); medium dense; light grayish brown; moist; mostly fine SAND; (+#4=0%, -#200=2.9%).			5		4							PA
27	27														
28	28														
29	29														
30	30														
31	31				S07	5	30	3			78				
32	32					12									
33	33					18									
34	34		Boring terminated at planned depth. Bottom of borehole at 31.5 ft bgs.												
35	35														
36	36														
37	37														
38	38														
39	39														
40	40														
41	41														
42	42														
43	43														
44	44														
45	45														
46	46														
47	47														
48	48														
49	49														
50	50														
51	51														
52	52														
53	53														
54	54														
55	55														



MINIMUM ARRA-FUNDED SEGMENT

Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.



Plate:

A-3B

LOGGED BY L.S. Bhangoor	BEGIN DATE 10-31-11	COMPLETION DATE 10-31-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 36° 47' 9" / -119° 51' 9"	HOLE ID S0003A
DRILLING CONTRACTOR Technicon Engineering Services, Inc.	BOREHOLE LOCATION (Offset, Station, Line) STA 2004+00		SURFACE ELEVATION	
DRILLING METHOD Hollow-Stem Auger	DRILL RIG CME 55		BOREHOLE DIAMETER 8 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) MC (2.5" I.D.) - SPT (1.4" I.D.)	SPT HAMMER TYPE 140 lbs		HAMMER EFFICIENCY, ERI 87%	
BOREHOLE BACKFILL AND COMPLETION NEAT CEMENT	GROUNDWATER READINGS	DURING DRILLING Not encountered on 10-31-2011	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING 31.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
0	0		SILTY SAND (SM); very dense; reddish brown; moist; mostly fine SAND; moderate to strong cementation.												
1	1														
2	2		(+ #4=0%, - #200=31.1%).		S01	8 25 50/2"	75/8				67				PA
3	3							10	110						PA, CP (Bulk 2'-5') PA
4	4		Trace fine GRAVEL; (+ #4=2.3%, - #200=33.3%).												
5	5				S02	12 25 12	37	15			72				CR
6	6		Very dense; brown; some fine SAND.												
7	7														
8	8														
9	9														
10	10				S03	5 9 13	22	14	99		100				DS
11	11		Medium dense; dark grayish brown; mostly fine SAND.												
12	12														
13	13														
14	14														
15	15				S04	2 3 4	7				100				PA
16	16		Poorly graded SAND (SP); loose; light grayish brown; moist; mostly fine SAND; (+ #4=0%, - #200=2.4%).					3							
17	17														
18	18														
19	19														
20	20				S05	2 4 7	11	3			100				
21	21		Medium dense; mostly coarse to medium SAND.												
22	22														
23	23														
24	24														
25	25														

(continued)

 		MINIMUM ARRA-FUNDED SEGMENT Merced to Fresno Section of the California High-Speed Train Project,	
Date: 10/26/2011		Job No.: 2009-138-400	
This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.			Plate: A-5A

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
	25		Poorly graded SAND (SP); loose; light grayish brown; moist; mostly fine SAND; (+#4=0%, -#200=2.4%).		S06	6	22				89				
	26		layer description continued from previous page			11									
	27		Poorly graded SAND (SP) (continued).			11		6							
	28		Poorly graded SAND with SILT (SP-SM); dense; light grayish brown; moist; mostly fine SAND; (+#4=0%, -#200=7.3%).												
	29														
	30														
	31		Medium dense.		S07	6	27	4	99		83				
	32					11									
	33		Boring terminated at planned depth.			16									
	34		Bottom of borehole at 31.5 ft bgs.												
	35														
	36														
	37														
	38														
	39														
	40														
	41														
	42														
	43														
	44														
	45														
	46														
	47														
	48														
	49														
	50														
	51														
	52														
	53														
	54														
	55														



MINIMUM ARRA-FUNDED SEGMENT

Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.



Plate:

A-5B

LOGGED BY L.S. Bhangoor	BEGIN DATE 11-1-11	COMPLETION DATE 11-1-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 36° 47' 36" / -119° 51' 40"	HOLE ID S0005A
DRILLING CONTRACTOR Technicon Engineering Services, Inc.	BOREHOLE LOCATION (Offset, Station, Line) STA 1967+50		SURFACE ELEVATION	
DRILLING METHOD Hollow-Stem Auger	DRILL RIG CME 55		BOREHOLE DIAMETER 8 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) MC (2.5" I.D.) - SPT (1.4" I.D.)	SPT HAMMER TYPE 140 lbs		HAMMER EFFICIENCY, ERI 87%	
BOREHOLE BACKFILL AND COMPLETION NEAT CEMENT	GROUNDWATER READINGS	DURING DRILLING	AFTER DRILLING (DATE) 35.0 ft on 11-1-11	TOTAL DEPTH OF BORING 121.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
0	0		SILTY SAND (SM); very dense; light brown; moist; mostly fine SAND.												
1	1														
2	2		SILTY SAND with GRAVEL (SM); very dense; light brown; moist; little fine GRAVEL; mostly fine SAND; (+#4=17.6%, -#200=32.5%).		S01	6	50/6"				56				PA
3	3		(+ #4=12.1%, -#200=37.2%).					4							PA, R, CP (Bulk 2'-5')
4	4		SANDY lean CLAY (CL); very stiff; reddish brown; moist; little fine SAND; low to medium plasticity fines.												PA
5	5				S02	6	8			PP = 2.5	100				PI, CR
6	6		Lean CLAY (CL); very stiff; reddish brown; moist; medium plasticity fines.			13		14							PI
7	7														
8	8		SILT with SAND (ML); very stiff; light grayish brown; moist; some fine SAND.												
9	9														
10	10		(+ #4=0%, -#200=71.7%).		S03	7	12			PP = 2.5	72				PA
11	11					16		12	103						
12	12														
13	13		SILTY SAND (SM); dense; yellowish brown; moist; mostly fine SAND.												
14	14														
15	15		Dense.		S04	7	8				89				PA
16	16					16		17							
17	17														
18	18														
19	19														
20	20		Medium dense.		S05	5	6	16			100				
21	21					10									
22	22														
23	23		CLAYEY SAND (SC); dense; light yellowish brown; moist; mostly fine SAND.												
24	24														
25	25														

(continued)

 	MINIMUM ARRA-FUNDED SEGMENT Merced to Fresno Section of the California High-Speed Train Project,	
	Date: 10/26/2011	Job No.: 2009-138-400
This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.		Plate: <div style="font-size: 24pt; font-weight: bold;">A-6A</div>

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
25	25		SANDY SILT (ML); hard; light yellowish brown; moist; mostly fine SAND; (-#200=66.8%).	X	S06	12 18 22	40	23			100				PA
26	26														
27	27														
28	28		SILTY SAND (SM); dense; yellowish brown; moist; mostly medium SAND; few fines.												
29	29														
30	30		Poorly graded SAND (SP); dense; light brown; moist; mostly medium SAND.	X	S07	9 16 20	36	4	101		89				DS
31	31														
32	32														
33	33														
34	34														
35	35		Medium dense; wet.	X	S08	5 7 13	20	23			89				
36	36														
37	37														
38	38														
39	39														
40	40														
41	41		Poorly graded SAND with SILT (SP-SM); dense; yellowish brown; wet; mostly medium SAND; (+#4=0%, -#200=5.6%).	X	S09	9 14 16	30	24			100				PA
42	42														
43	43														
44	44														
45	45		Medium dense.	X	S10	9 9 10	19	23			89				
46	46														
47	47														
48	48														
49	49														
50	50														
51	51		SILTY SAND (SM); very dense; yellowish brown; wet; mostly medium SAND; few fines; yellowish brown to light gray.	X	S11	17 25 33	58	6	104		83				
52	52														
53	53														
54	54														
55	55														

(continued)


MINIMUM ARRA-FUNDED SEGMENT
Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-6B

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
	56		SILTY SAND (SM) (continued).	X	S12	10 11 13	24				100				
	57		Poorly graded SAND with SILT (SP-SM); dense; yellowish brown; wet; mostly fine SAND; (+#4=0%, -#200=6.5%).					21							PA
	58														
	59														
	60		Mostly medium to fine SAND.	X	S13	11 14 16	30	20			89				
	61														
	62														
	63														
	64														
	65			X	S14	18 27 30	57	9	102		78				DS
	66		SILTY SAND (SM); dense; light gray; wet; mostly fine SAND.												
	67														
	68														
	69														
	70			X	S15	8 11 33	44	30		PP = 3.25	83				PA
	71		SILT with SAND (ML); very stiff; light gray; wet; mostly fine SAND; (+#4=0%, -#200=77.3%).												PA
	72														
	73														
	74														
	75			X	S16	21 27 30	57	23	105		78				
	76		Hard.												
	77														
	78														
	79														
	80			X	S17	50/6"	REF				33				PA
	81		SILTY SAND (SM); very dense; light gray; wet; mostly fine SAND; (+#4=14.2%, -#200=16.0%).					33							
	82														
	83														
	84														
	85														

(continued)


MINIMUM ARRA-FUNDED SEGMENT
Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-6C

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
86			SILTY SAND (SM) (continued).	X	S18	20 21 21	42				72				
87			Poorly graded SAND with SILT (SP-SM); very dense; dark brown; wet; mostly fine SAND; (+#4=0%, -#200=10.6%).					22							PA
88															
89			SANDY lean CLAY (CL); very stiff; brown; wet; little fine SAND; low plasticity fines.												
90				X	S19	28 50/2"	50/2	32			44				
91															
92			SILT with SAND (ML); hard; light grayish brown; wet; mostly fine SAND.												
93															
94															
95				X	S20	21 50/5"	50/5	31	89	PP = >4	44				
96															
97															
98															
99															
100				X	S21	30 34 51	85			PP = 1.75	72				PA
101			SILTY SAND (SM); very dense; light grayish brown; moist; mostly fine SAND; (+#4=0%, -#200=43.8%).					27							
102															
103															
104															
105				X	S22	9 17 37	54	23	101		78				DS
106			Dense; yellowish brown; mostly medium to fine SAND; weak cementation.												
107															
108															
109															
110				X	S23	17 17 18	35	24			72				
111															
112			SILT with SAND (ML); very stiff; light yellowish brown; wet; some fine SAND.												
113															
114															
115				X											

(continued)


MINIMUM ARRA-FUNDED SEGMENT
Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-6D

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
116			CLAYEY SAND (SC); very dense; light yellowish brown; wet; mostly fine SAND. <i>layer description continued from previous page</i>	X	S24	13 27 35	62	47			83				PA
117			SILT with SAND (ML); very stiff; light yellowish brown; wet; mostly fine SAND; (+#4=0%, -#200=71.6%).												
118															
119			Lean CLAY with SAND (CL); hard; light yellowish brown; wet; some fine SAND; low to medium plasticity fines.												
120					S25	22 36 50/5"	86/11	31	84	PP = 2	72				
121															
122			Boring terminated at planned depth. Bottom of borehole at 121.5 ft bgs.												
123															
124															
125															
126															
127															
128															
129															
130															
131															
132															
133															
134															
135															
136															
137															
138															
139															
140															
141															
142															
143															
144															
145															



MINIMUM ARRA-FUNDED SEGMENT

Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.



Plate:

A-6E

LOGGED BY L.S. Bhangoor	BEGIN DATE 10-31-11	COMPLETION DATE 10-31-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 36° 47' 59" / -119° 52' 5"	HOLE ID S0006A
DRILLING CONTRACTOR Technicon Engineering Services, Inc.	BOREHOLE LOCATION (Offset, Station, Line) STA 1939+50		SURFACE ELEVATION	
DRILLING METHOD Hollow-Stem Auger	DRILL RIG CME 55		BOREHOLE DIAMETER 8 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) MC (2.5" I.D.) - SPT (1.4" I.D.)	SPT HAMMER TYPE 140 lbs		HAMMER EFFICIENCY, ERI 87%	
BOREHOLE BACKFILL AND COMPLETION NEAT CEMENT	GROUNDWATER READINGS	DURING DRILLING Not encountered on 10-31-2011	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING 31.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
0	0		SILTY SAND (SM); medium dense; reddish brown; moist; mostly fine SAND.												
1	1														
2	2														
3	3				S01	12	14				100				
4	4		(+ #4=0%, - #200=33.1%).			6									
5	5					8									
6	6		Very dense; yellowish brown; mostly fine SAND.		S02	13	61	11			100				R, PA, CP (Bulk 2'-5') PA
7	7					35									CR
8	8					26									
9	9														
10	10				S03	2	11				100				
11	11		Medium dense; trace fine GRAVEL; mostly fine SAND; (+ #4=4.3%, - #200=16.8%).			4									PA
12	12					7		6	101						
13	13														
14	14														
15	15				S04	4	11	4	98		89				
16	16		Poorly graded SAND (SP); loose; yellowish brown to light gray; moist; mostly fine SAND.			6									DS
17	17					5									
18	18		SANDY lean CLAY (CL); very stiff; brown; moist; low to medium plasticity fines.												
19	19														
20	20				S05	2	19				72				
21	21		Lean CLAY (CL); very stiff; black; moist; medium plasticity fines.			5									PI
22	22					14		17							
23	23		SILTY SAND (SM); very dense; light grayish brown; moist; mostly fine SAND.												
24	24														
25	25														

(continued)

 	MINIMUM ARRA-FUNDED SEGMENT Merced to Fresno Section of the California High-Speed Train Project,	
	Date: 10/26/2011	Job No.: 2009-138-400
This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.		Plate: A-7A

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
25			SILTY SAND (SM); very dense; light grayish brown; moist; mostly fine SAND. <i>layer description continued from previous page</i> SANDY SILT (ML); hard; light grayish brown; moist; mostly fine SAND; (+#4=0%, -#200=67.4%).		S06	6 30 44	74				72				PA
26								11							
27															
28															
29															
30															
31					S07	6 21 50/3"	71/9	30	92	PP = >4	78				
32			Boring terminated at planned depth. Bottom of borehole at 31.5 ft bgs.												
33															
34															
35															
36															
37															
38															
39															
40															
41															
42															
43															
44															
45															
46															
47															
48															
49															
50															
51															
52															
53															
54															
55															



MINIMUM ARRA-FUNDED SEGMENT

Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.



Plate:

A-7B

LOGGED BY L.S. Bhangoor	BEGIN DATE 10-31-11	COMPLETION DATE 10-31-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 36° 48' 13" / -119° 52' 21"	HOLE ID S0007A
DRILLING CONTRACTOR Technicon Engineering Services, Inc.	BOREHOLE LOCATION (Offset, Station, Line) STA 1917+50		SURFACE ELEVATION	
DRILLING METHOD Hollow-Stem Auger	DRILL RIG CME 55		BOREHOLE DIAMETER 8 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) MC (2.5" I.D.) - SPT (1.4" I.D.)	SPT HAMMER TYPE 140 lbs		HAMMER EFFICIENCY, ERI 87%	
BOREHOLE BACKFILL AND COMPLETION NEAT CEMENT	GROUNDWATER READINGS	DURING DRILLING Not encountered on 10-31-2011	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING 31.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
0	0		SILTY SAND (SM); very dense; reddish brown; moist; mostly fine SAND; moderate to strong cementation.												
1	1														
2	2														
3	3		(+ #4=0%, - #200=30.4%).	X	S01	2 13 50/5"	63/11	7	117	PP = >4	61				PA
4	4		Trace fine GRAVEL; (+ #4=4%, - #200=26.3%).												PA
5	5		Medium dense; grayish brown.	X	S02	9 6 4	10	13			89				CR
6	6														
7	7														
8	8														
9	9														
10	10			X	S03	6 7 10	17	20			100				
11	11														
12	12														
13	13														
14	14														
15	15			X	S04	13 50/5"	50/5	8	120	PP = >4	56				PA
16	16		Very dense; light yellowish brown; mostly coarse to medium SAND; (+ #4=0%, - #200=29.7%).												
17	17														
18	18														
19	19														
20	20			X	S05	3 9 12	21	2			100				
21	21		Medium dense; yellowish brown; mostly fine SAND.												
22	22														
23	23														
24	24														
25	25														

(continued)

 		MINIMUM ARRA-FUNDED SEGMENT Merced to Fresno Section of the California High-Speed Train Project,	
Date: 10/26/2011		Job No.: 2009-138-400	
This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.			Plate: A-8A

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
25	25		SILTY SAND (SM); very dense; reddish brown; moist; mostly fine SAND; moderate to strong cementation.		S06	3	21				100				
26	26		<i>layer description continued from previous page</i>			9		3							PA
27	27		SILTY SAND (SM) (continued).			12									
28	28		Poorly graded SAND (SP); medium dense; light grayish brown; mostly fine SAND; trace fines; (+#4=0%, -#200=4.6%).												
29	29														
30	30														
31	31		Mostly medium to fine SAND.		S07	7	29	3	95		89				DS
32	32					13									
33	33		Boring terminated at planned depth.			16									
34	34		Bottom of borehole at 31.5 ft bgs.												
35	35														
36	36														
37	37														
38	38														
39	39														
40	40														
41	41														
42	42														
43	43														
44	44														
45	45														
46	46														
47	47														
48	48														
49	49														
50	50														
51	51														
52	52														
53	53														
54	54														
55	55														



MINIMUM ARRA-FUNDED SEGMENT

Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.



Plate:

A-8B

LOGGED BY L.S. Bhango	BEGIN DATE 10-27-11	COMPLETION DATE 10-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 36° 48' 30" / -119° 52' 41"	HOLE ID S0008A
DRILLING CONTRACTOR Technicon Engineering Services, Inc.	BOREHOLE LOCATION (Offset, Station, Line) STA 1894+50			SURFACE ELEVATION
DRILLING METHOD Hollow-Stem Auger	DRILL RIG CME 55			BOREHOLE DIAMETER 8.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID) MC (2.5" I.D.) - SPT (1.4" I.D.)	SPT HAMMER TYPE 140 lbs			HAMMER EFFICIENCY, ERI 87%
BOREHOLE BACKFILL AND COMPLETION NEAT CEMENT	GROUNDWATER READINGS	DURING DRILLING	AFTER DRILLING (DATE) 105.0 ft on 10-27-11	TOTAL DEPTH OF BORING 121.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
0	0		SILTY SAND (SM); very dense; yellowish brown; moist; mostly fine SAND; moderate cementation.												
1	1														
2	2														
3	3				S01	18 60/6"	60/6	4	125		56				
4	4		(+ #4=8%, - #200=31.2%).												
5	5		CLAYEY SAND (SC); very dense; reddish brown; moist; mostly fine SAND.												PA, EI, R, CP (Bulk 2'-5') PA
6	6				S02	15 18 20	38				61				PA
7	7		SANDY SILT (ML); stiff; reddish brown; moist; mostly fine SAND; mostly fines; (- #200=49.90%).					9							
8	8														
9	9		Lean CLAY (CL); very stiff; light grayish brown; moist; low to medium plasticity fines.												
10	10														
11	11		SILT (ML); hard; light grayish brown; moist.		S03	5 12 29	41				78				PI, CR PI
12	12							33							
13	13														
14	14														
15	15														
16	16				S04	6 26 22	48	25	96	PP = >4.5	72				
17	17		SILTY SAND (SM); dense; reddish brown; moist; mostly fine SAND.												
18	18														
19	19														
20	20														
21	21		Very dense; light grayish brown; (+ #4=0%, - #200=37.4%).		S05	6 24 39	63				72				PA
22	22							7	104						
23	23														
24	24														
25	25														

(continued)

 		MINIMUM ARRA-FUNDED SEGMENT Merced to Fresno Section of the California High-Speed Train Project,	
Date: 10/26/2011		Job No.: 2009-138-400	
This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.			Plate: A-9A

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
25	25		SILTY SAND (SM); dense; reddish brown; moist; mostly fine SAND. <i>layer description continued from previous page</i>	X	S06	17 32 43	75	12 7	114		78				
26	26		Olive brown.												DS
27	27		SILTY SAND (SM) (continued).												PA
28	28														
29	29														
30	30		Dense; yellowish brown.	X	S07	7 11 16	27	4			100				
31	31														
32	32														
33	33														
34	34														
35	35		Very dense; light grayish brown; (+#4=2.4%, -#200=14.6%).	X	S08	10 22 42	64				89				PA
36	36														
37	37														
38	38														
39	39														
40	40		Reddish brown.	X	S09	7 38 42	80	16			89				
41	41														
42	42														
43	43														
44	44														
45	45														
46	46			X	S10	20 22 36	58	10	123		72				
47	47														
48	48														
49	49														
50	50														
51	51		Well-graded SAND with SILT (SW-SM); dense; light grayish brown; moist; mostly medium to fine SAND; (+#4=0%, -#200=8.8%).	X	S11	6 13 14	27				89				PA
52	52							3							
53	53														
54	54														
55	55														

(continued)


MINIMUM ARRA-FUNDED SEGMENT
Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-9B

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
56			Medium dense; little fine GRAVEL. Well-graded SAND with SILT (SW-SM) (continued). Well-graded SAND with SILT (SW-SM); dense; light grayish brown; moist; mostly medium to fine SAND; (+#4=0%, -#200=8.8%). layer description continued from previous page	X	S12	4 8 13	21	23			83				
57															
58															
59															
60			Very dense; little fines.	X	S13	13 20 36	56	16			89				
61															
62															
63															
64															
65			SILT (ML); hard; light brown; moist; mostly fines; (-#200=88.3%).	X	S14	17 32 46	78				78				
66								32	91						PA
67															
68			Little fine GRAVEL; some coarse to medium SAND.												
69															
70			Poorly graded SAND (SP); dense; light brown; moist; mostly coarse to medium SAND.	X	S15	10 24 24	48	2	98		78				
71															DS
72															
73															
74			SILT with SAND (ML); hard; gray; moist; mostly fine SAND.												
75				X	S16	25 33 28	61	19			89				
76			SANDY SILT (ML); hard; gray; moist; mostly fine SAND.												
77															
78															
79			Lean CLAY (CL); hard; light brown; moist; low to medium plasticity fines.												
80				X	S17	19 60/3"	60/3				50				UU
81			SILT with SAND (ML); hard; yellowish brown; moist; mostly fine SAND.												
82															
83															
84															
85															

(continued)


MINIMUM ARRA-FUNDED SEGMENT
Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-9C

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
86			SILT with SAND (ML) (continued). SILT with SAND (ML); hard; yellowish brown; moist; mostly fine SAND. layer description continued from previous page	X	S18	3 23 25	48	20	75		72				PI
87															
88			SILTY SAND (SM); very dense; light brown; moist; mostly fine SAND.												
89															
90				X	S19	17 27 34	61				78				DS
91															
92															
93															
94			SILT with SAND (ML); very stiff; light gray; moist; mostly fine SAND.												
95				X	S20	9 18 18	36	13			78				PA
96			SANDY SILT (ML); hard; light gray; moist; mostly fine SAND; (+#4=0%, -#200=52.2%).												
97															
98			SILTY SAND (SM); very dense; light gray; moist; mostly fine SAND.												
99															
100				X	S21	13 28 32	60	17	91		72				
101															
102															
103															
104															
105			Well-graded SAND with SILT (SW-SM); very dense; brown; wet; mostly medium to fine SAND; (+#4=0%, -#200=8.1%).	X	S22	14 23 32	55	12			83				PA
106															
107															
108															
109															
110				X	S23	11 26 33	59	15			72				
111															
112															
113															
114															
115				X											

(continued)


MINIMUM ARRA-FUNDED SEGMENT
Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-9D

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
116			SILTY SAND (SM); very dense; dark brown; mostly fine SAND; (+#4=1%, -#200=44.0%). <i>layer description continued from previous page</i>	X	S24	9 30 28	58	34			72				PA
117															
118															
119															
120															
121				X	S25	32 60/6"	60/6	21			67				
122			Boring terminated at planned depth. Bottom of borehole at 121.5 ft bgs.												
123															
124															
125															
126															
127															
128															
129															
130															
131															
132															
133															
134															
135															
136															
137															
138															
139															
140															
141															
142															
143															
144															
145															



MINIMUM ARRA-FUNDED SEGMENT

Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-9E

LOGGED BY L.S. Bhangoor	BEGIN DATE 10-28-11	COMPLETION DATE 10-28-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 36° 48' 53" / -119° 53' 12"	HOLE ID S0009R
DRILLING CONTRACTOR Technicon Engineering Services, Inc.	BOREHOLE LOCATION (Offset, Station, Line) STA 1858+50		SURFACE ELEVATION 0.0 ft	
DRILLING METHOD Hollow-Stem Auger	DRILL RIG CME 55		BOREHOLE DIAMETER 8 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) MC (2.5" I.D.) - SPT (1.4" I.D.)	SPT HAMMER TYPE 140 lbs		HAMMER EFFICIENCY, ERI 87%	
BOREHOLE BACKFILL AND COMPLETION NEAT CEMENT	GROUNDWATER READINGS	DURING DRILLING	AFTER DRILLING (DATE) 18.0 ft on 10-28-11	TOTAL DEPTH OF BORING 111.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
0	0		SILTY SAND (SM); dense; reddish brown; moist; mostly fine SAND; moderate cementation.												
-2.00	2			X	S01	7 19 27	46	3	114		78				PA
	3		(+ #4=0%, - #200=19.9%).												PA
-4.00	4		Trace fine GRAVEL; (+ #4=4.3%, - #200=24.5%).												R, PA, CP (Bulk 2'-5')
	5		Medium dense; little fine GRAVEL.												PA
-6.00	6			X	S02	4 6 6	12	7			72				CR
-8.00	8														
-10.00	10		Medium dense; light reddish brown.												
	11			X	S03	5 6 5	11	8			44				
-12.00	12														
-14.00	14														
-16.00	16		Well-graded SAND with SILT (SW-SM); loose; light reddish brown; moist; mostly fine SAND; (+ #4=3.5%, - #200=11.2%).	X	S04	2 3 4	7				56				PA
-18.00	18														
-20.00	20		Dense; light grayish brown; mostly medium to fine SAND.	X	S05	7 17 14	31	12			67				
-22.00	22														
-24.00	24		Lean CLAY with SAND (CL); hard; light grayish brown; moist; some fine SAND; low to medium plasticity fines.												
	25														

(continued)



MINIMUM ARRA-FUNDED SEGMENT

Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-10A

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
-25.00	25		Lean CLAY with SAND (CL) (continued).		S06	17 42 44	86	24	100	PP = >4	72				
-26.00	26		SILT (ML); hard; light grayish brown; moist.												
-28.00	28		CLAYEY SAND (SC); very dense; light grayish brown; moist; mostly fine SAND.												
-30.00	30				S07	23 37 35	72			PP = >4	78				
-32.00	32		SILT (ML); hard; light grayish brown; moist; mostly fines; (+#4=0%, -#200=88.2%).					28	95						PA
-34.00	34		SILT with SAND (ML); hard; light grayish brown; wet; mostly fine SAND.												
-36.00	36				S08	9 28 25	53	22		PP = 1.75	89				
-38.00	38		CLAYEY SAND (SC); very dense; light brown; wet; mostly fine SAND.												
-40.00	40		SILT (ML); hard; light grayish brown; wet; mostly fine SAND.		S09	16 43 49	92	22	106	PP = >4	72				
-42.00	42														
-44.00	44		SILT with SAND (ML); hard; light grayish brown; moist; mostly fine SAND.												
-46.00	46				S10	24 60/3"	60/3	27	97	PP = >4	50				
-48.00	48														
-50.00	50		CLAYEY SAND (SC); very dense; reddish brown; moist; little fine GRAVEL; mostly fine SAND; some fines.												
-52.00	52		SILTY SAND (SM); very dense; light reddish brown; wet; mostly medium to fine SAND; (-#200=43.5%).		S11	11 19 21	40				78				PA
-54.00	54							41							
-55.00	55														

(continued)



MINIMUM ARRA-FUNDED SEGMENT

Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-10B

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
-56.00	56		SILTY SAND (SM) (continued). SILTY SAND (SM); very dense; light reddish brown; wet; mostly medium to fine SAND; (-#200=43.5%). layer description continued from previous page	X	S12	28 37 34	71				83				
-58.00	58														
-60.00	60		Dense; light grayish brown; mostly fine SAND.	X	S13	10 14 16	30	12			78				
-62.00	62														
-64.00	64														
-66.00	66		Very dense.	X	S14	17 18 20	38	16			89				
-68.00	68														
-70.00	70		Very dense; reddish brown.	X	S15	14 25 37	62	18			83				
-72.00	72														
-74.00	74														
-76.00	76		Olive brown; mostly medium to fine SAND.	X	S16	52 60/4"	60/4	15	107		56				DS
-78.00	78														
-80.00	80		SILT (ML); hard; light grayish brown; wet; mostly fines; (+#4=0%, -#200=93.3%).	X	S17	11 18 30	48				78				PA
-82.00	82							29							
-84.00	84														
-85.00	85														

(continued)


MINIMUM ARRA-FUNDED SEGMENT
Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-10C

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
-86.00	86		CLAYEY SAND (SC); very dense; light grayish brown; wet; little fine GRAVEL; mostly medium to fine SAND; (+#4=14.6%, -#200=36.3%). <i>layer description continued from previous page</i>	X	S18	34 50/6"	50/6	25			61				PA
-88.00	88														
-90.00	90		SANDY lean CLAY (CL); hard; light grayish brown; wet; little fine GRAVEL; some fine SAND; low to medium plasticity fines.	X	S19	33 60/5"	60/5	28		PP = 1.5	56				
-92.00	92		SILT with SAND (ML); hard; light grayish brown; wet; mostly fine SAND.	X											PA
-94.00	94														
-96.00	96		SANDY SILT (ML); hard; light grayish brown; wet; some fine SAND; mostly fines; (+#4=0%, -#200=64.1%).	X	S20	38 60/6"	60/6	25	88		61				
-98.00	98		SILTY SAND (SM); very dense; light grayish brown; wet; mostly medium to fine SAND.												PA
-100.00	100		Mostly fine SAND.	X	S21	16 24 27	51	17			72				
-102.00	102														
-104.00	104														PA
-106.00	106														
-108.00	108														
-110.00	110		Medium dense; light gray; wet; mostly coarse to fine SAND.	X	S23	8 9 9	18	74			72				PA
-112.00	112														
-114.00	114														
-115.00	115														
			Boring terminated at planned depth. Bottom of borehole at 111.5 ft bgs.												



MINIMUM ARRA-FUNDED SEGMENT

Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.



Plate:

A-10D

LOGGED BY L.S. Bhango	BEGIN DATE 10-31-11	COMPLETION DATE 10-31-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 36° 49' 9" / -119° 53' 36"	HOLE ID S0010A
DRILLING CONTRACTOR Technicon Engineering Services, Inc.	BOREHOLE LOCATION (Offset, Station, Line) STA 1834+00		SURFACE ELEVATION	
DRILLING METHOD Hollow-Stem Auger	DRILL RIG CME 55		BOREHOLE DIAMETER 8 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) MC (2.5" I.D.) - SPT (1.4" I.D.)	SPT HAMMER TYPE 140 lbs		HAMMER EFFICIENCY, ERI 87%	
BOREHOLE BACKFILL AND COMPLETION NEAT CEMENT	GROUNDWATER READINGS	DURING DRILLING Not encountered on 10-31-2011	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING 31.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
0	0		SILTY SAND (SM); very dense; reddish brown; moist; mostly fine SAND; moderate cementation.												
1	1														
2	2														
3	3		(+ #4=0%, - #200=27.3%).		S01	5	79/9				78				PA, CL
4	4		(+ #4=1.3%, - #200=31.7%).			29									R, CP, PA (Bulk 2'-5')
5	5		Medium dense.			50/3"									PA
6	6				S02	10	11	4			100				CR
7	7					5									
8	8					6									
9	9														
10	10														
11	11		Poorly graded SAND with SILT (SP-SM); medium dense; reddish brown; moist; trace fine GRAVEL; mostly fine SAND; few fines; (+ #4=4.3%, - #200=8.0%).		S03	3	14				89				PA
12	12					8		3							
13	13					6									
14	14														
15	15		Poorly graded SAND (SP); medium dense; light brown; moist; mostly coarse to medium SAND.		S04	3	16	3	98		100				DS
16	16					7									
17	17					9									
18	18														
19	19														
20	20		Poorly graded SAND with SILT (SP-SM); medium dense; yellowish brown; mostly fine SAND.		S05	5	12	2			100				
21	21					7									
22	22					5									
23	23														
24	24														
25	25														

(continued)

 	MINIMUM ARRA-FUNDED SEGMENT Merced to Fresno Section of the California High-Speed Train Project,	
	Date: 10/26/2011	Job No.: 2009-138-400
This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.		Plate: <div style="font-size: 1.5em; font-weight: bold;">A-11A</div>

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
25	25		Poorly graded SAND with SILT (SP-SM); medium dense; yellowish brown; mostly fine SAND. <i>layer description continued from previous page</i>	X	S06	4	26				89				
26	26		Dense; trace fine GRAVEL; (+#4=3.5%, -#200=5.2%).			12		2	138						
27	27		Poorly graded SAND with SILT (SP-SM) (continued).			14									
28	28														
29	29														
30	30		Very dense; little fine GRAVEL.	X	S07	34	50/3	8	111		50				
31	31					50/3"									
32	32		Boring terminated at planned depth. Bottom of borehole at 31.5 ft bgs.												
33	33														
34	34														
35	35														
36	36														
37	37														
38	38														
39	39														
40	40														
41	41														
42	42														
43	43														
44	44														
45	45														
46	46														
47	47														
48	48														
49	49														
50	50														
51	51														
52	52														
53	53														
54	54														
55	55														



MINIMUM ARRA-FUNDED SEGMENT

Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

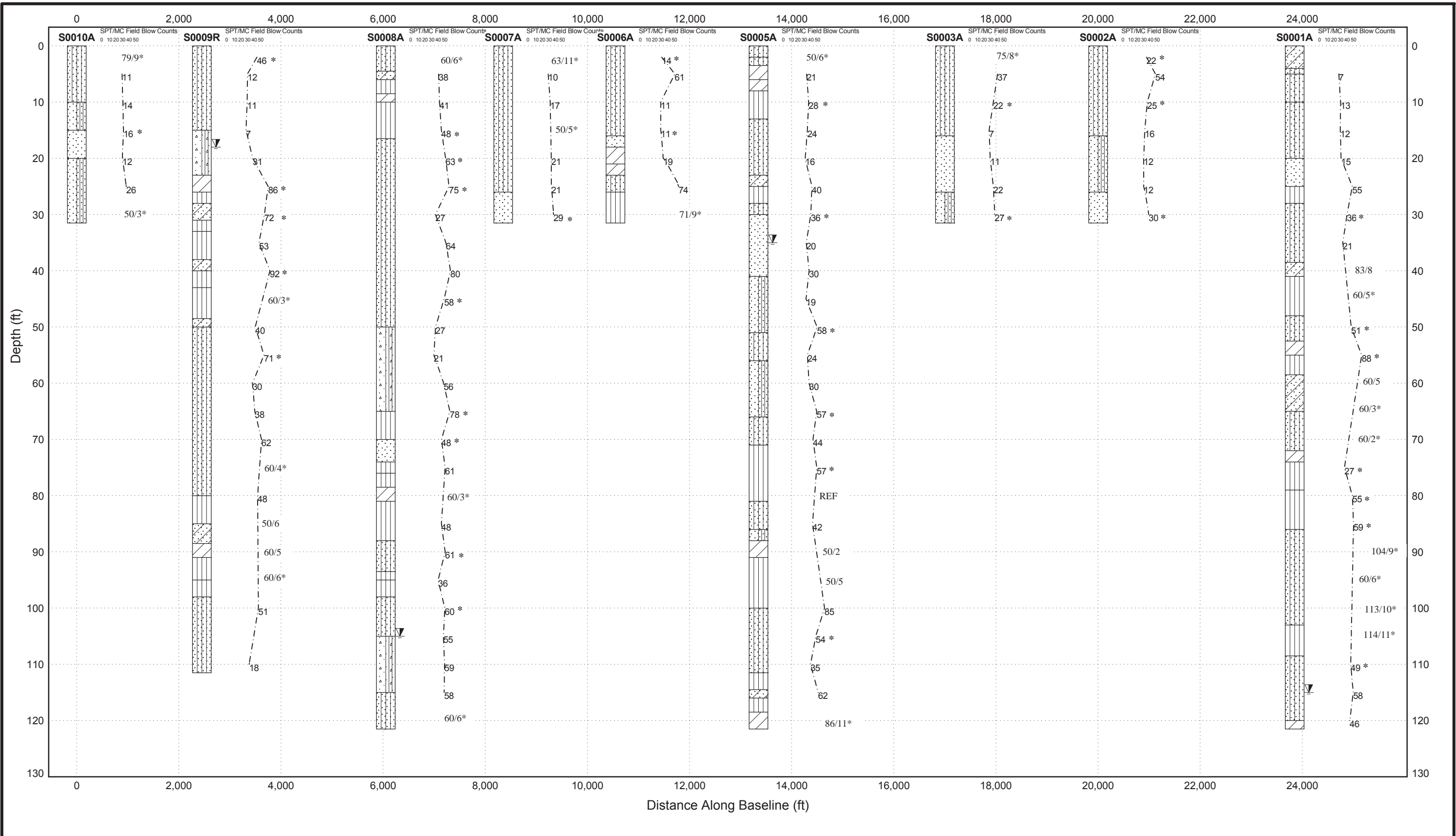
Job No.: 2009-138-400

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate:

A-11B

PCI STRATIGRAPHY & GW - B SIZE COPY OF 2009-138-400.GPJ DATA TEMPLATE.GDT 12/12/11



USCS Clayey Sand

USCS Silty Sand

USCS Poorly Graded Sand

USCS Silt

USCS Lean Clay

USCS Poorly Graded Sand with silt

USCS Well-graded Sand with silt

* Indicates Modified California Sampler (MC) blow counts per foot.

Static Water Level Reading

PARIKH CONSULTANTS, INC.

GEOTECHNICAL CONSULTANTS

MATERIALS ENGINEERING

SUBSURFACE DIAGRAM: CROSS-SECTION

Minimum ARRA-funded Segment

Merced to Fresno Section of the California High-Speed Train Project,

Date: 10/26/2011

Job No.: 2009-138-400

Plate: A-12



GREGG DRILLING & TESTING, INC.
GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION SERVICES

October 28, 2011

Parikh Consultants
Attn: Frank Li

Subject: CPT Site Investigation
California High Speed Rail
, California
GREGG Project Number: 11-632SH

Dear Mr. Li:

The following report presents the results of GREGG Drilling & Testing's Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	<input checked="" type="checkbox"/>
2	Pore Pressure Dissipation Tests	(PPD)	<input checked="" type="checkbox"/>
3	Seismic Cone Penetration Tests	(SCPTU)	<input checked="" type="checkbox"/>
4	UVOST Laser Induced Fluorescence	(UVOST)	<input type="checkbox"/>
5	Groundwater Sampling	(GWS)	<input type="checkbox"/>
6	Soil Sampling	(SS)	<input type="checkbox"/>
7	Vapor Sampling	(VS)	<input type="checkbox"/>
8	Pressuremeter Testing	(PMT)	<input type="checkbox"/>
9	Vane Shear Testing	(VST)	<input type="checkbox"/>
10	Dilatometer Testing	(DMT)	<input type="checkbox"/>

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact our office at (562) 427-6899.

Sincerely,

Peter Robertson
Technical Director, Gregg Drilling & Testing, Inc.



GREGG DRILLING & TESTING, INC.
GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION SERVICES

Cone Penetration Test Sounding Summary

-Table 1-

CPT Sounding Identification	Date	Termination Depth (Feet)	Depth of Groundwater Samples (Feet)	Depth of Soil Samples (Feet)	Depth of Pore Pressure Dissipation Tests (Feet)
SCPT-4	10/27/11	76	-	-	71.0



Bibliography

Lunne, T., Robertson, P.K. and Powell, J.J.M., "Cone Penetration Testing in Geotechnical Practice"
E & FN Spon. ISBN 0 419 23750, 1997

Roberston, P.K., "Soil Classification using the Cone Penetration Test", Canadian Geotechnical Journal, Vol. 27,
1990 pp. 151-158.

Mayne, P.W., "NHI (2002) Manual on Subsurface Investigations: Geotechnical Site Characterization", available
through www.ce.gatech.edu/~geosys/Faculty/Mayne/papers/index.html, Section 5.3, pp. 107-112.

Robertson, P.K., R.G. Campanella, D. Gillespie and A. Rice, "Seismic CPT to Measure In-Situ Shear Wave Velocity",
Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8, 1986
pp. 791-803.

Robertson, P.K., Sully, J., Woeller, D.J., Lunne, T., Powell, J.J.M., and Gillespie, D.J., "Guidelines for Estimating
Consolidation Parameters in Soils from Piezocone Tests", Canadian Geotechnical Journal, Vol. 29, No. 4,
August 1992, pp. 539-550.

Robertson, P.K., T. Lunne and J.J.M. Powell, "Geo-Environmental Application of Penetration Testing", Geotechnical
Site Characterization, Robertson & Mayne (editors), 1998 Balkema, Rotterdam, ISBN 90 5410 939 4 pp 35-47.

Campanella, R.G. and I. Weemeees, "Development and Use of An Electrical Resistivity Cone for Groundwater
Contamination Studies", Canadian Geotechnical Journal, Vol. 27 No. 5, 1990 pp. 557-567.

DeGroot, D.J. and A.J. Lutenegeger, "Reliability of Soil Gas Sampling and Characterization Techniques", International
Site Characterization Conference - Atlanta, 1998.

Woeller, D.J., P.K. Robertson, T.J. Boyd and Dave Thomas, "Detection of Polyaromatic Hydrocarbon Contaminants
Using the UVIF-CPT", 53rd Canadian Geotechnical Conference Montreal, QC October pp. 733-739, 2000.

Zemo, D.A., T.A. Delfino, J.D. Gallinatti, V.A. Baker and L.R. Hilpert, "Field Comparison of Analytical Results from
Discrete-Depth Groundwater Samplers" BAT EnviroProbe and QED HydroPunch, Sixth national Outdoor Action
Conference, Las Vegas, Nevada Proceedings, 1992, pp 299-312.

Copies of ASTM Standards are available through www.astm.org



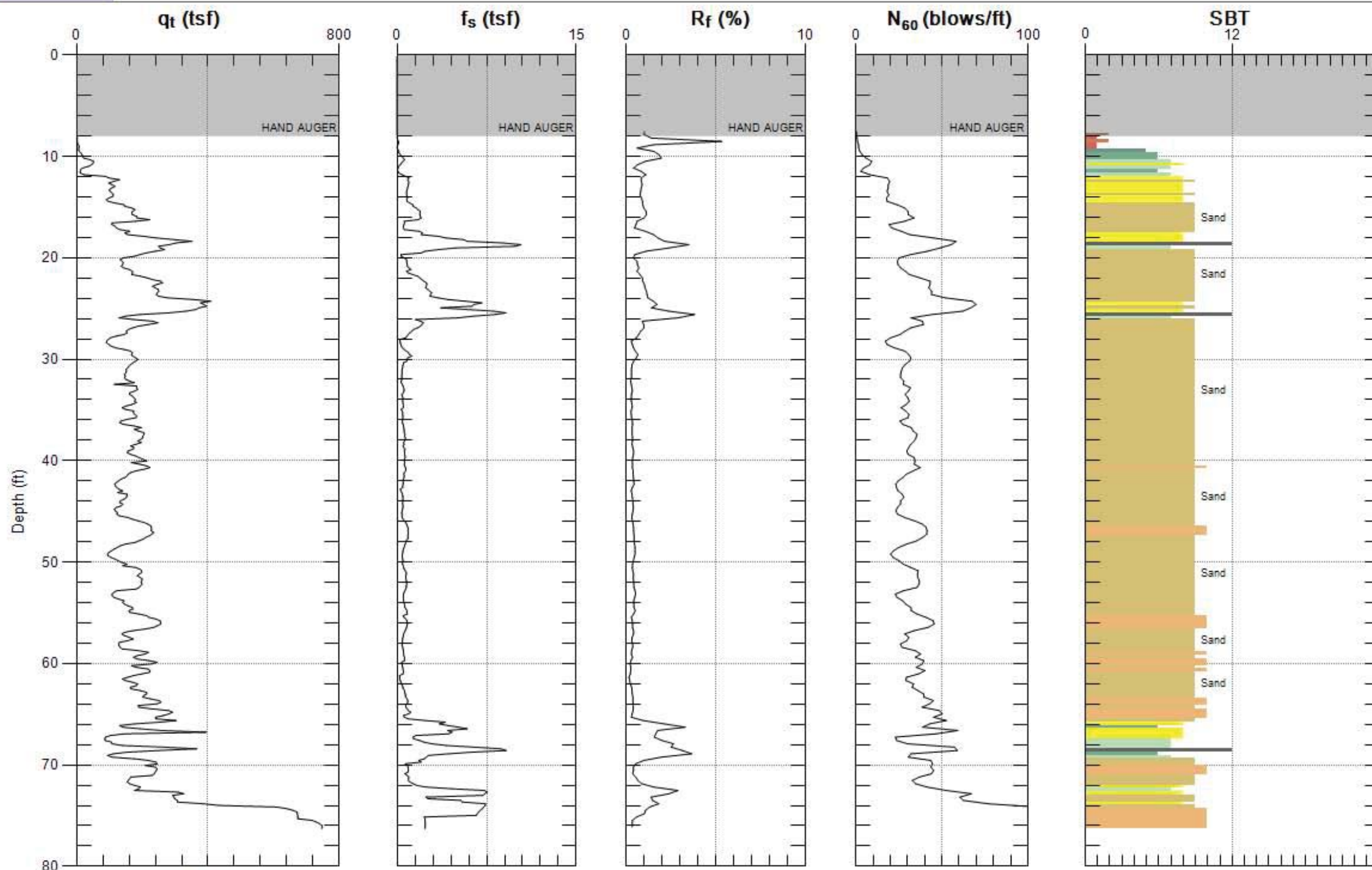
PARIKH CONSULTANTS

Site: CHSR

Sounding: SCPT-4

Engineer: F.LI

Date: 10/27/2011 01:55



Max. Depth: 76.280 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)



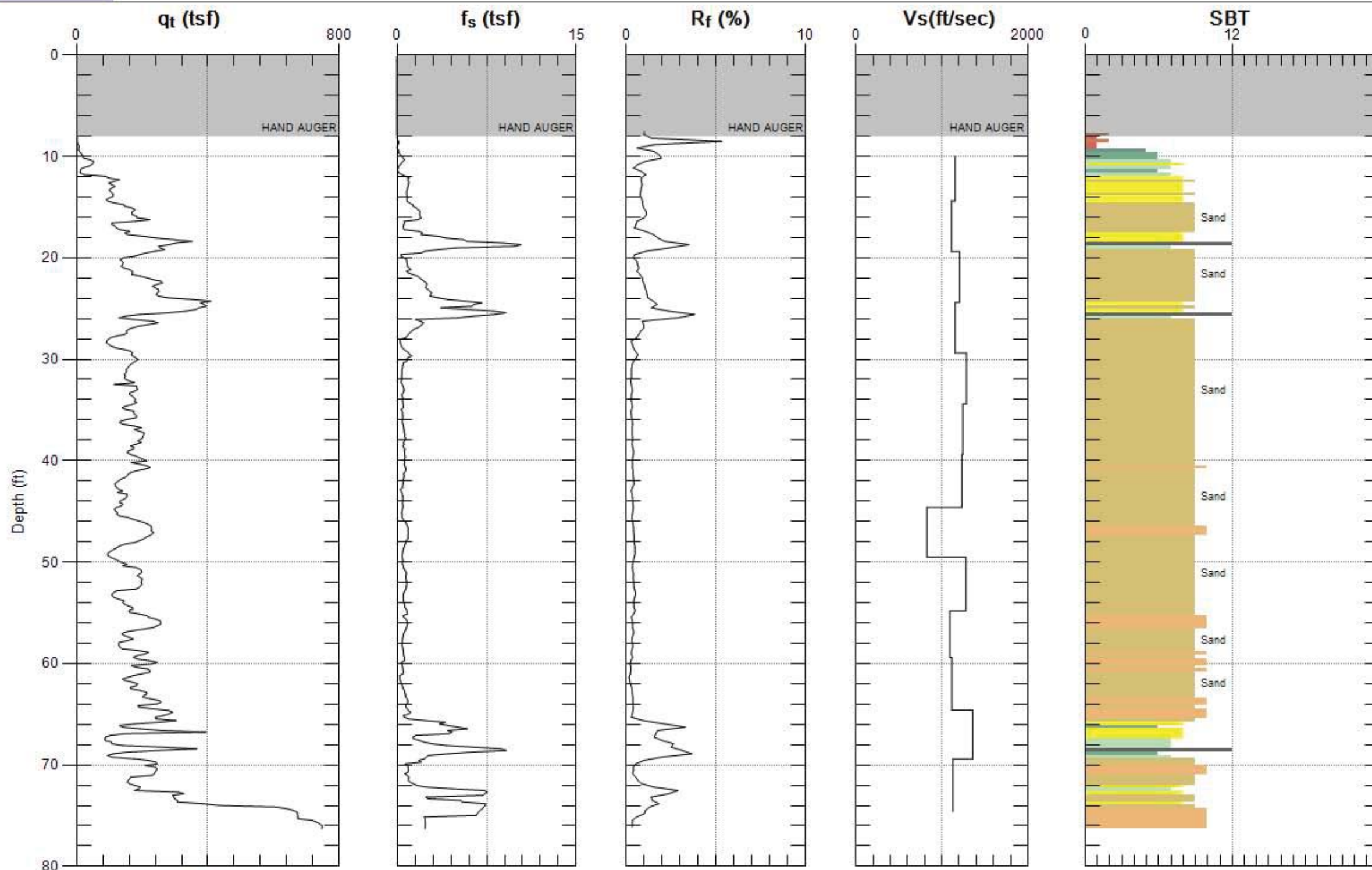
PARIKH CONSULTANTS

Site: CHSR

Sounding: SCPT-4

Engineer: F.LI

Date: 10/27/2011 01:55



Max. Depth: 76.280 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)



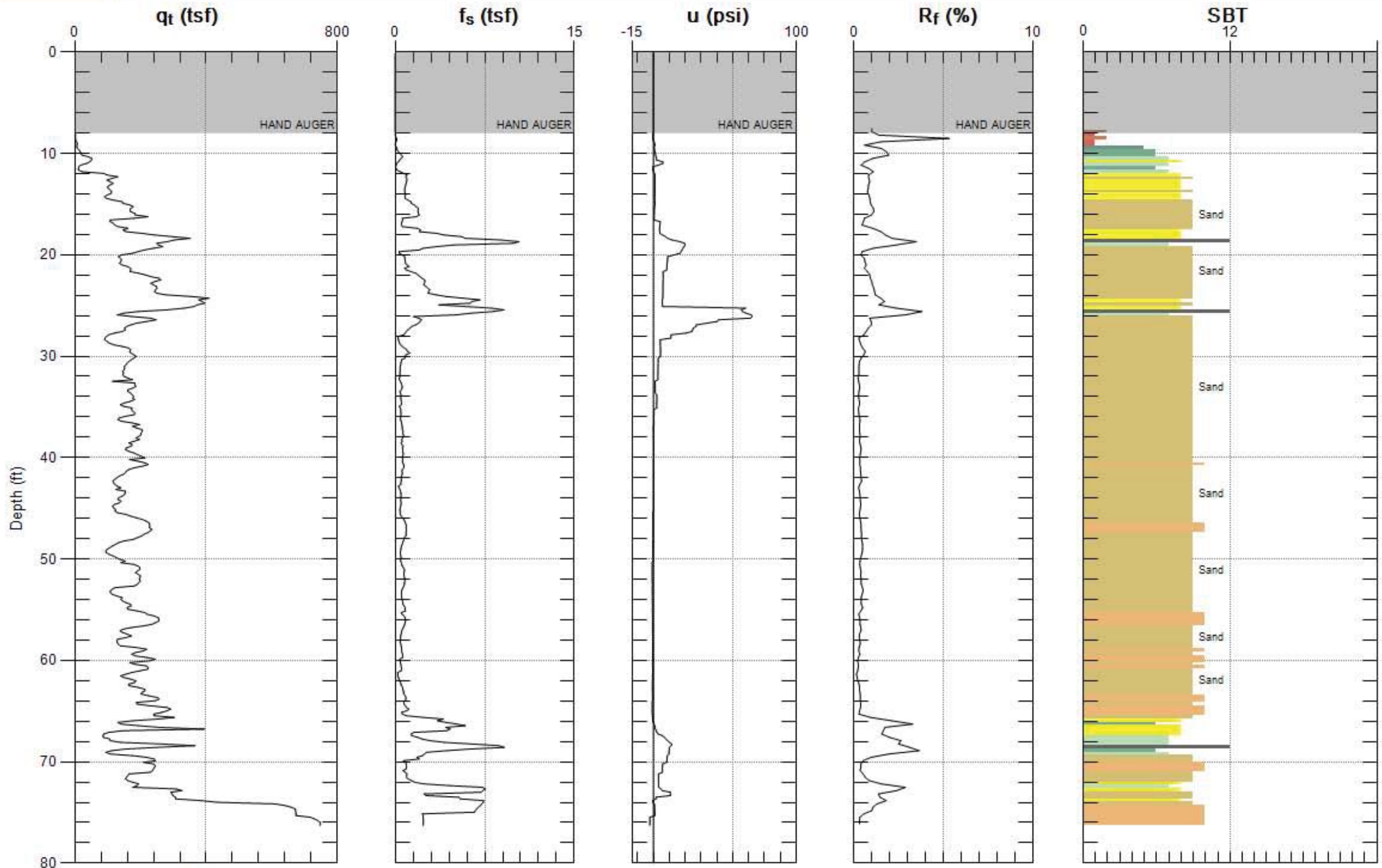
PARIKH CONSULTANTS

Site: CHSR

Sounding: SCPT-4

Engineer: F.LI

Date: 10/27/2011 01:55



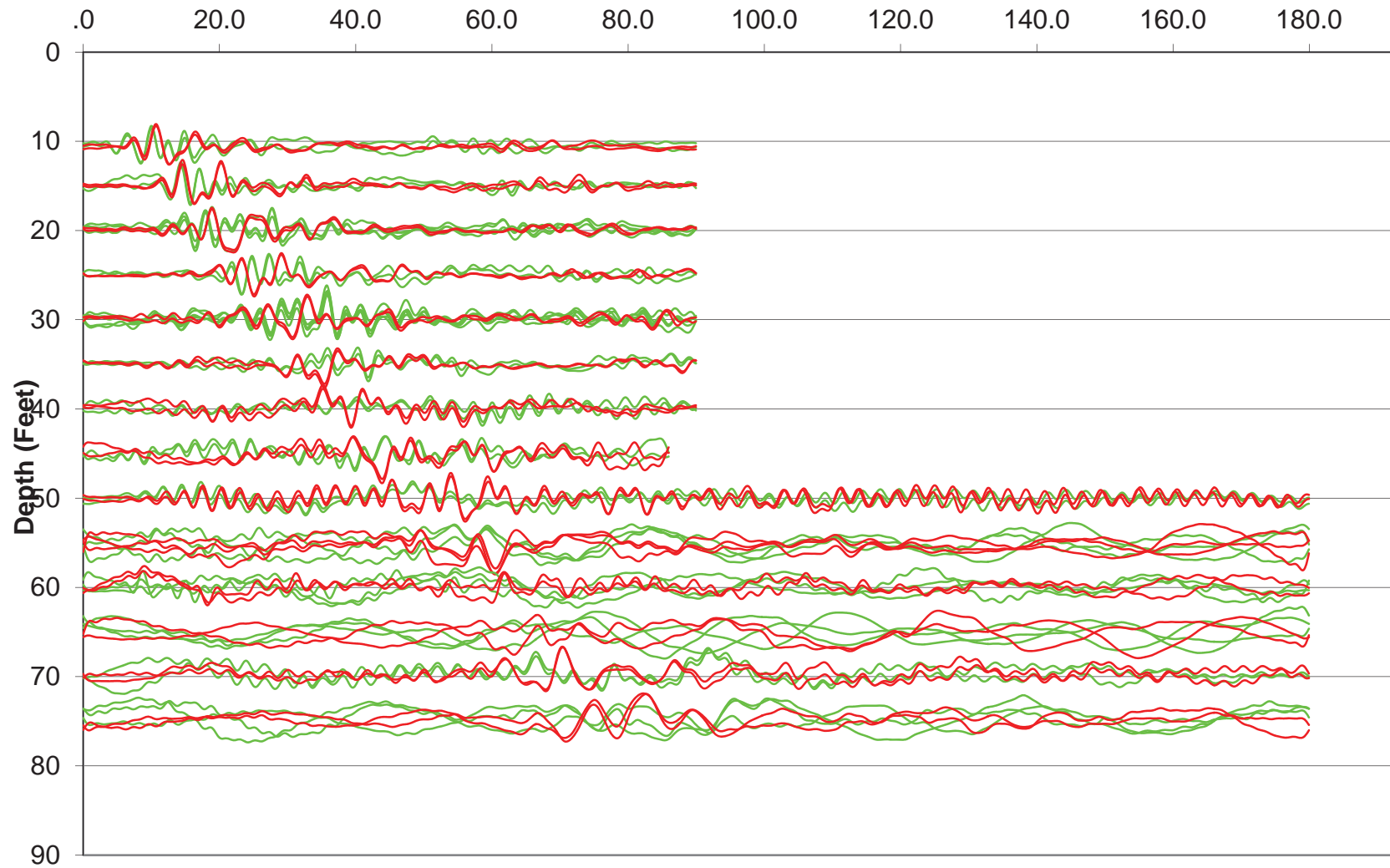
Max. Depth: 76.280 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)



Waveforms for Sounding SCPT-4

Time (ms)





Shear Wave Velocity Calculations

CHSR
SCPT-4

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

10/27/11

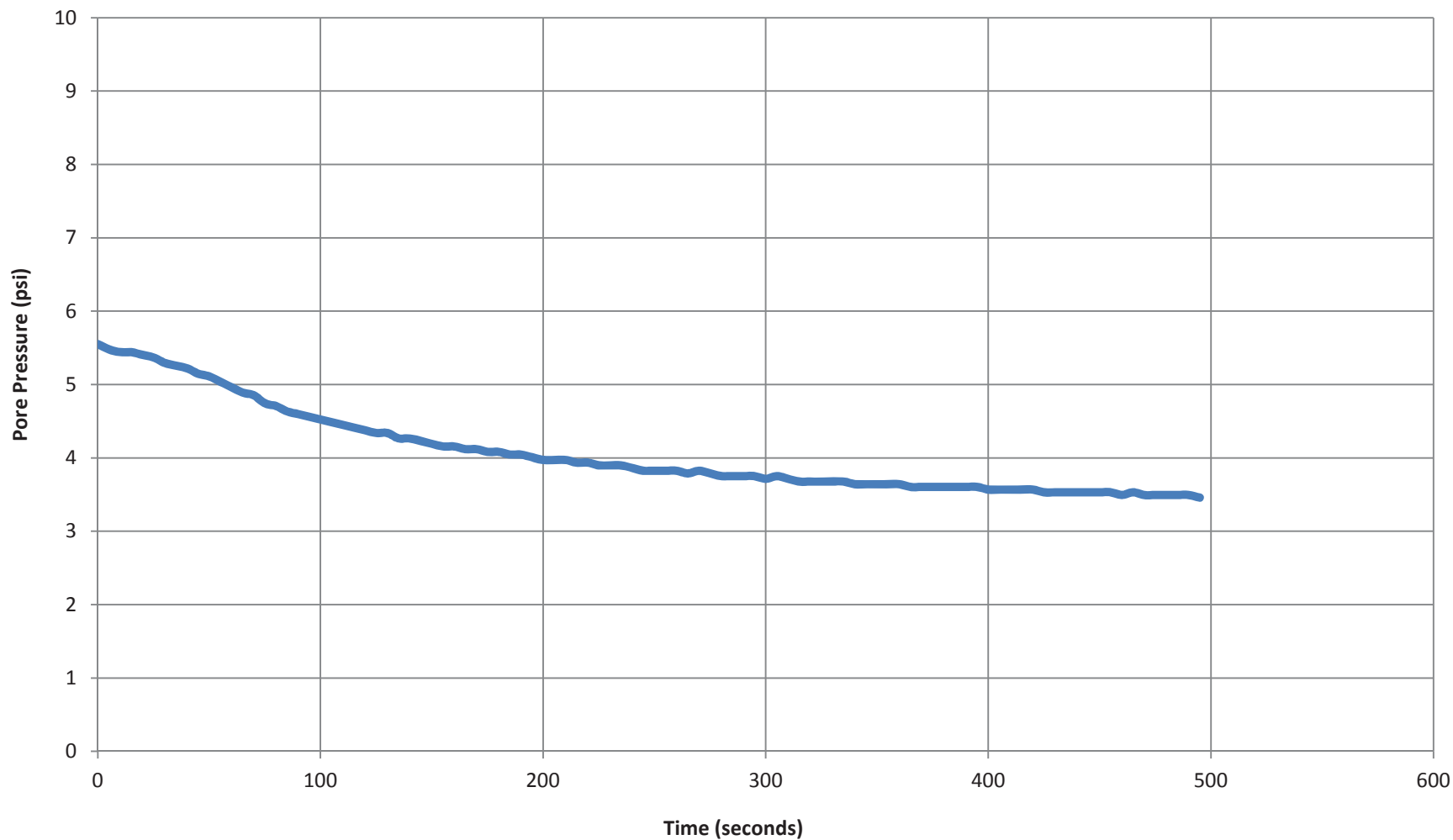
Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
10.66	10.00	10.14	10.14	10.7000			
15.09	14.43	14.53	4.39	14.5000	3.8000	1154.5	12.22
20.01	19.35	19.42	4.90	18.9000	4.4000	1112.9	16.89
25.10	24.44	24.50	5.07	23.1000	4.2000	1207.2	21.90
30.02	29.36	29.41	4.91	27.3500	4.2500	1155.7	26.90
35.10	34.44	34.49	5.08	31.3000	3.9500	1285.6	31.90
40.03	39.37	39.40	4.92	35.2500	3.9500	1244.6	36.91
45.28	44.62	44.65	5.25	39.5000	4.2500	1234.2	41.99
50.20	49.54	49.56	4.92	45.4500	5.9500	826.6	47.08
55.45	54.79	54.81	5.25	49.5500	4.1000	1279.7	52.16
60.04	59.38	59.40	4.59	53.7500	4.2000	1093.1	57.08
65.29	64.63	64.65	5.25	58.4500	4.7000	1116.5	62.00
70.05	69.39	69.41	4.76	61.9500	3.5000	1358.8	67.01
75.30	74.64	74.65	5.25	66.6000	4.6500	1128.6	72.01



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: SCPT-4
Depth: 71.03 ft
Site: CHSR
Engineer: F.LI





Cone Penetration Testing Procedure (CPT)

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*. The soundings were conducted using a 20 ton capacity cone with a tip area of 15 cm^2 and a friction sleeve area of 225 cm^2 . The cone is designed with an equal end area friction sleeve and a tip end area ratio of 0.80.

The cone takes measurements of cone bearing (q_c), sleeve friction (f_s) and penetration pore water pressure (u_2) at 5-cm intervals during penetration to provide a nearly continuous log. CPT data reduction and interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored on disk for further analysis and reference. All CPT soundings are performed in accordance with revised (2007) ASTM standards (D 5778-07).

The cone also contains a porous filter element located directly behind the cone tip (u_2). It consists of porous plastic and is 5.0mm thick. The filter element is used to obtain penetration pore pressure as the cone is advanced as well as Pore Pressure Dissipation Tests (PPDT's) during appropriate pauses in penetration. It should be noted that prior to penetration, the element is fully saturated with oil under vacuum pressure to ensure accurate and fast dissipation.

The cone has the following accuracy:
1 tsf for q_c , 0.02 tsf for f_s and 0.5 psi for u_2 . In soft clays, a lower capacity cone should be used for improved accuracy.

When the soundings are complete, the test holes are grouted. The grouting procedures generally consist of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

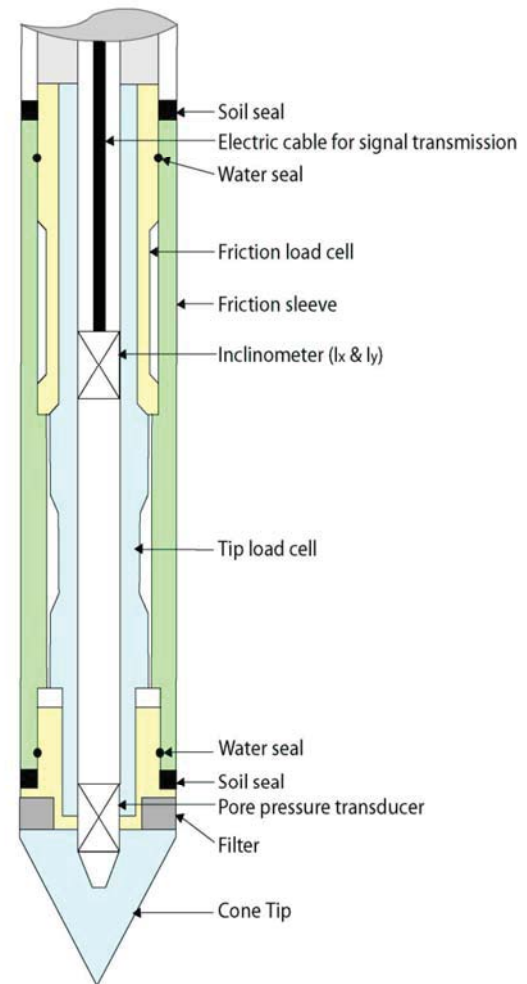


Figure CPT



Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected from your site are presented in graphical form in the attached report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1986). For CPT soundings extending greater than 50 feet, we recommend the use of the normalized charts of Robertson (1990) which can be displayed as SBTn, upon request. The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. do not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and do not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on the field observations and/or CPT results, but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Note that it is not always possible to clearly identify a soil type based solely on q_t , f_s , and u_2 . In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.

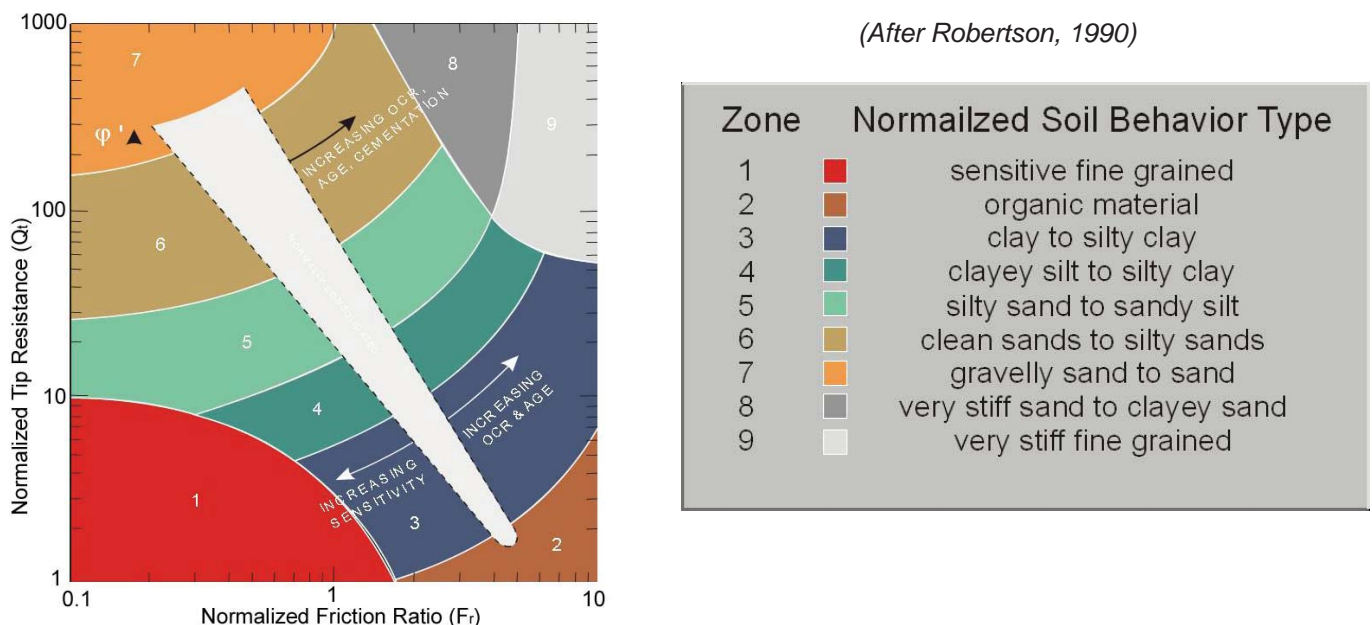


Figure SBTn



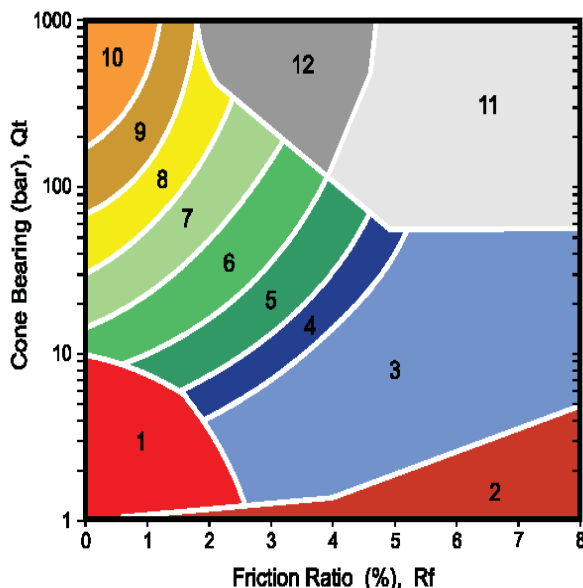
Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected from your site are presented in graphical form in the attached report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1986). For CPT soundings extending greater than 50 feet, we recommend the use of the normalized charts of Robertson (1990) which can be displayed as SBTn, upon request. The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. do not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and do not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results, but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Note that it is not always possible to clearly identify a soil type based solely on q_t , f_s , and u_2 . In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.



(After Robertson, et al., 1986)

ZONE	SBT
1	Sensitive, fine grained
2	Organic materials
3	Clay
4	Silty clay to clay
5	Clayey silt to silty clay
6	Sandy silt to clayey silt
7	Silty sand to sandy silt
8	Sand to silty sand
9	Sand
10	Gravely sand to sand
11	Very stiff fine grained*
12	Sand to clayey sand*

*over consolidated or cemented

Figure SBT



Cone Penetration Test (CPT) Interpretation

Gregg has recently updated their CPT interpretation and plotting software (2007). The software takes the CPT data and performs basic interpretation in terms of soil behavior type (SBT) and various geotechnical parameters using current published empirical correlations based on the comprehensive review by Lunne, Robertson and Powell (1997). The interpretation is presented in tabular format using MS Excel. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

The following provides a summary of the methods used for the interpretation. Many of the empirical correlations to estimate geotechnical parameters have constants that have a range of values depending on soil type, geologic origin and other factors. The software uses 'default' values that have been selected to provide, in general, conservatively low estimates of the various geotechnical parameters.

Input:

- 1 Units for display (Imperial or metric) (atm. pressure, $p_a = 0.96$ tsf or 0.1 MPa)
- 2 Depth interval to average results, (ft or m). Data are collected at either 0.02 or 0.05m and can be averaged every 1, 3 or 5 intervals.
- 3 Elevation of ground surface (ft or m)
- 4 Depth to water table, z_w (ft or m) – input required
- 5 Net area ratio for cone, a (default to 0.80)
- 6 Relative Density constant, C_{Dr} (default to 350)
- 7 Young's modulus number for sands, α (default to 5)
- 8 Small strain shear modulus number
 - a. for sands, S_G (default to 180 for SBT_n 5, 6, 7)
 - b. for clays, C_G (default to 50 for SBT_n 1, 2, 3 & 4)
- 9 Undrained shear strength cone factor for clays, N_{kt} (default to 15)
- 10 Over Consolidation ratio number, k_{ocr} (default to 0.3)
- 11 Unit weight of water, (default to $\gamma_w = 62.4$ lb/ft³ or 9.81 kN/m³)

Column

- 1 Depth, z , (m) – CPT data is collected in meters
- 2 Depth (ft)
- 3 Cone resistance, q_c (tsf or MPa)
- 4 Sleeve friction, f_s (tsf or MPa)
- 5 Penetration pore pressure, u (psi or MPa), measured behind the cone (i.e. u_2)
- 6 Other – any additional data, if collected, e.g. electrical resistivity or UVIF
- 7 Total cone resistance, q_t (tsf or MPa) $q_t = q_c + u(1-a)$

8	Friction Ratio, R_f (%)	$R_f = (f_s/q_t) \times 100\%$
9	Soil Behavior Type (non-normalized), SBT	see note
10	Unit weight, γ (pcf or kN/m^3)	based on SBT, see note
11	Total overburden stress, σ_v (tsf)	$\sigma_{vo} = \gamma z$
12	Insitu pore pressure, u_o (tsf)	$u_o = \gamma_w (z - z_w)$
13	Effective overburden stress, σ'_{vo} (tsf)	$\sigma'_{vo} = \sigma_{vo} - u_o$
14	Normalized cone resistance, Q_{tl}	$Q_{tl} = (q_t - \sigma_{vo}) / \sigma'_{vo}$
15	Normalized friction ratio, F_r (%)	$F_r = f_s / (q_t - \sigma_{vo}) \times 100\%$
16	Normalized Pore Pressure ratio, B_q	$B_q = u - u_o / (q_t - \sigma_{vo})$
17	Soil Behavior Type (normalized), SBT_n	see note
18	SBT_n Index, I_c	see note
19	Normalized Cone resistance, Q_{tn} (n varies with I_c)	see note
20	Estimated permeability, k_{SBT} (cm/sec or ft/sec)	see note
21	Equivalent SPT N_{60} , blows/ft	see note
22	Equivalent SPT $(N_1)_{60}$ blows/ft	see note
23	Estimated Relative Density, D_r , (%)	see note
24	Estimated Friction Angle, ϕ' , (degrees)	see note
25	Estimated Young's modulus, E_s (tsf)	see note
26	Estimated small strain Shear modulus, G_o (tsf)	see note
27	Estimated Undrained shear strength, s_u (tsf)	see note
28	Estimated Undrained strength ratio	s_u/σ'_v
29	Estimated Over Consolidation ratio, OCR	see note

Notes:

- 1 Soil Behavior Type (non-normalized), SBT listed below Lunne et al. (1997)
- 2 Unit weight, γ either constant at 119 pcf or based on Non-normalized SBT (Lunne et al., 1997 and table below)
- 3 Soil Behavior Type (Normalized), SBT_n Lunne et al. (1997)
- 4 SBT_n Index, I_c $I_c = ((3.47 - \log Q_{tl})^2 + (\log F_r + 1.22)^2)^{0.5}$
- 5 Normalized Cone resistance, Q_{tn} (n varies with I_c)

$Q_{tn} = ((q_t - \sigma_{vo})/p_a) (p_a/(\sigma'_{vo})^n$ and recalculate I_c , then iterate:

When $I_c < 1.64$, $n = 0.5$ (clean sand)
 When $I_c > 3.30$, $n = 1.0$ (clays)
 When $1.64 < I_c < 3.30$, $n = (I_c - 1.64)0.3 + 0.5$
 Iterate until the change in n, $\Delta n < 0.01$

- 6 Estimated permeability, k_{SBT} (based on Normalized SBT_n)
(Lunne et al., 1997 and table below)
- 7 Equivalent SPT N_{60} , blows/ft Lunne et al. (1997)
- $$\frac{(q_t/p_a)}{N_{60}} = 8.5 \left(1 - \frac{I_c}{4.6} \right)$$
- 8 Equivalent SPT $(N_1)_{60}$ blows/ft $(N_1)_{60} = N_{60} C_N$
where $C_N = (p_a/\sigma'_{vo})^{0.5}$
- 9 Relative Density, D_r , (%) $D_r^2 = Q_{tn} / C_{Dr}$
Only SBT_n 5, 6, 7 & 8 Show 'N/A' in zones 1, 2, 3, 4 & 9
- 10 Friction Angle, ϕ' , (degrees) $\tan \phi' = \frac{1}{2.68} \left[\log \left(\frac{q_c}{\sigma'_{vo}} \right) + 0.29 \right]$
Only SBT_n 5, 6, 7 & 8 Show 'N/A' in zones 1, 2, 3, 4 & 9
- 11 Young's modulus, E_s $E_s = \alpha q_t$
Only SBT_n 5, 6, 7 & 8 Show 'N/A' in zones 1, 2, 3, 4 & 9
- 12 Small strain shear modulus, G_o
a. $G_o = S_G (q_t \sigma'_{vo} p_a)^{1/3}$ For SBT_n 5, 6, 7
b. $G_o = C_G q_t$ For SBT_n 1, 2, 3 & 4
Show 'N/A' in zones 8 & 9
- 13 Undrained shear strength, s_u $s_u = (q_t - \sigma_{vo}) / N_{kt}$
Only SBT_n 1, 2, 3, 4 & 9 Show 'N/A' in zones 5, 6, 7 & 8
- 14 Over Consolidation ratio, OCR $\text{OCR} = k_{ocr} Q_{t1}$
Only SBT_n 1, 2, 3, 4 & 9 Show 'N/A' in zones 5, 6, 7 & 8

SBT Zones

The following updated and simplified SBT descriptions have been used in the software:

- 1 sensitive fine grained
- 2 organic soil
- 3 clay
- 4 clay & silty clay
- 5 clay & silty clay
- 6 sandy silt & clayey silt
- 7 silty sand & sandy silt
- 8 sand & silty sand
- 9 sand
- 10 sand

SBT_n Zones

- 1 sensitive fine grained
- 2 organic soil
- 3 clay
- 4 clay & silty clay
- 5 silty sand & sandy silt
- 6 sand & silty sand
- 7 sand

11	very dense/stiff soil*	8	very dense/stiff soil*
12	very dense/stiff soil*	9	very dense/stiff soil*

*heavily overconsolidated and/or cemented

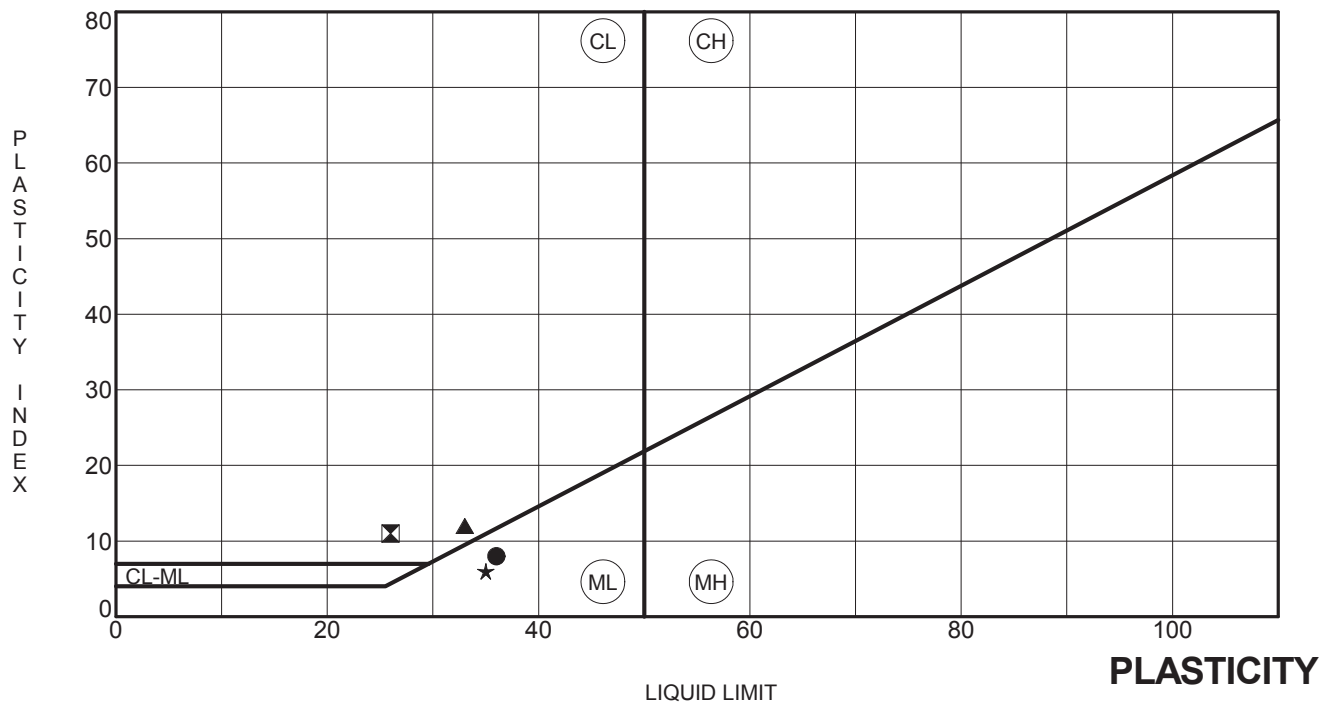
Track when soils fall with zones of same description and print that description (i.e. if soils fall only within SBT zones 4 & 5, print 'clays & silty clays')

Estimated Permeability (see Lunne et al., 1997)

SBT _n	Permeability (ft/sec)	(m/sec)
1	3×10^{-8}	1×10^{-8}
2	3×10^{-7}	1×10^{-7}
3	1×10^{-9}	3×10^{-10}
4	3×10^{-8}	1×10^{-8}
5	3×10^{-6}	1×10^{-6}
6	3×10^{-4}	1×10^{-4}
7	3×10^{-2}	1×10^{-2}
8	3×10^{-6}	1×10^{-6}
9	1×10^{-8}	3×10^{-9}

Estimated Unit Weight (see Lunne et al., 1997)

SBT	Approximate Unit Weight (lb/ft ³)	(kN/m ³)
1	111.4	17.5
2	79.6	12.5
3	111.4	17.5
4	114.6	18.0
5	114.6	18.0
6	114.6	18.0
7	117.8	18.5
8	120.9	19.0
9	124.1	19.5
10	127.3	20.0
11	130.5	20.5
12	120.9	19.0



BOREHOLE SAMPLE #	DEPTH (ft)	LL	PL	PI	Fines	USCS Classification
● S0001A	S12	56.0	36	28	8	SILT
⊠ S0005A	S02	6.0	26	15	11	Lean CLAY
▲ S0006A	S05	21.0	33	21	12	Lean CLAY
★ S0008A	S03	11.0	35	29	6	SILT

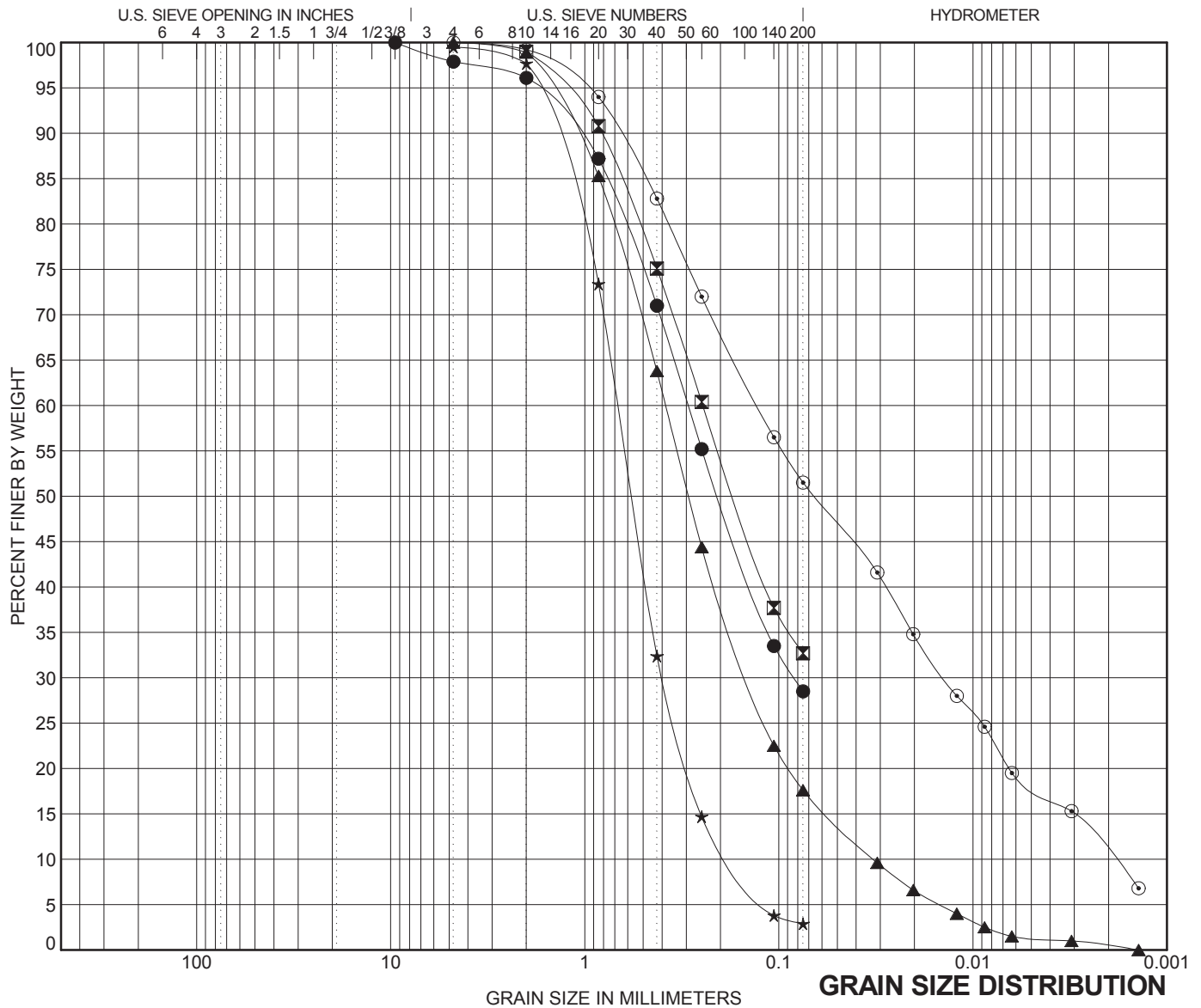


PARIKH CONSULTANTS, INC.
 GEOTECHNICAL CONSULTANTS
 MATERIALS ENGINEERING

Minimum ARRA-funded Segment
 Merced to Fresno Section of the California High-Speed Train Project,

JOB NO:2009-138-400

PLATE NO: B-2



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BORING SAMPLE # DEPTH (ft)				Classification				LL	PL	PI	Cc	Cu
●	S0001A	S01	3.0	CLAYEY SAND								
⊠	S0001A	BULK	4.0	SILTY SAND								
▲	S0001A	S03	11.0	SILTY SAND							1.62	11.79
★	S0001A	S05	21.0	Poorly graded SAND							1.34	3.92
⊙	S0001A	S09	41.0	SANDY SILT							0.82	68.13
BORING SAMPLE # DEPTH (ft)				D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
●	S0001A	S01	3.0	9.5	0.294	0.083		2.1	69.4	28.5		
⊠	S0001A	BULK	4.0	2	0.246				66.3	32.7		
▲	S0001A	S03	11.0	4.75	0.383	0.142	0.032	0.0	82.4	16.3	1.3	
★	S0001A	S05	21.0	4.75	0.678	0.395	0.173		96.6	2.9		
⊙	S0001A	S09	41.0	4.75	0.129	0.014	0.002	0.0	48.5	33.4	18.1	

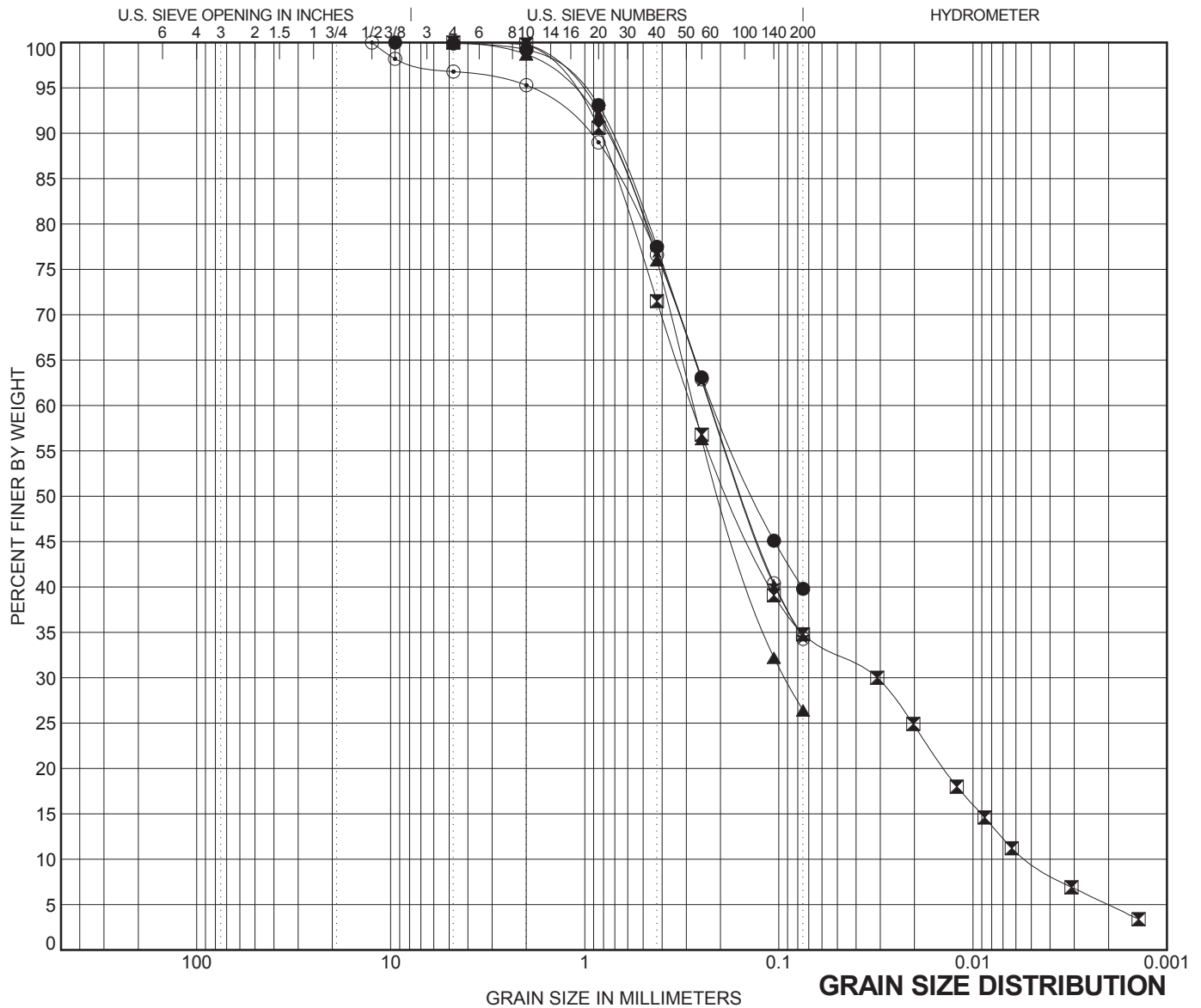


PARIKH CONSULTANTS, INC.
 GEOTECHNICAL CONSULTANTS
 MATERIALS ENGINEERING

Minimum ARRA-funded Segment
 Merced to Fresno Section of the California High-Speed Train Project,

JOB NO:2009-138-400

PLATE NO: B-3A



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BORING SAMPLE # DEPTH (ft)				Classification				LL	PL	PI	Cc	Cu
●	S0001A	S13	61.0	CLAYEY SAND								
☒	S0001A	S18	86.0	SILTY SAND							0.67	54.29
▲	S0001A	S21	101.0	SILTY SAND								
★	S0002A	S01	3.0	SILTY SAND								
⊙	S0002A	BULK	4.0	SILTY SAND								
BORING SAMPLE # DEPTH (ft)				D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
●	S0001A	S13	61.0	9.5	0.216			0.1	60.1	39.8		
☒	S0001A	S18	86.0	4.75	0.281	0.031	0.005	0.0	65.2	25.0	9.8	
▲	S0001A	S21	101.0	4.75	0.276	0.093		0.0	73.6	26.4		
★	S0002A	S01	3.0	4.75	0.225			0.0	65.5	34.5		
⊙	S0002A	BULK	4.0	12.5	0.224			3.2	62.5	34.3		

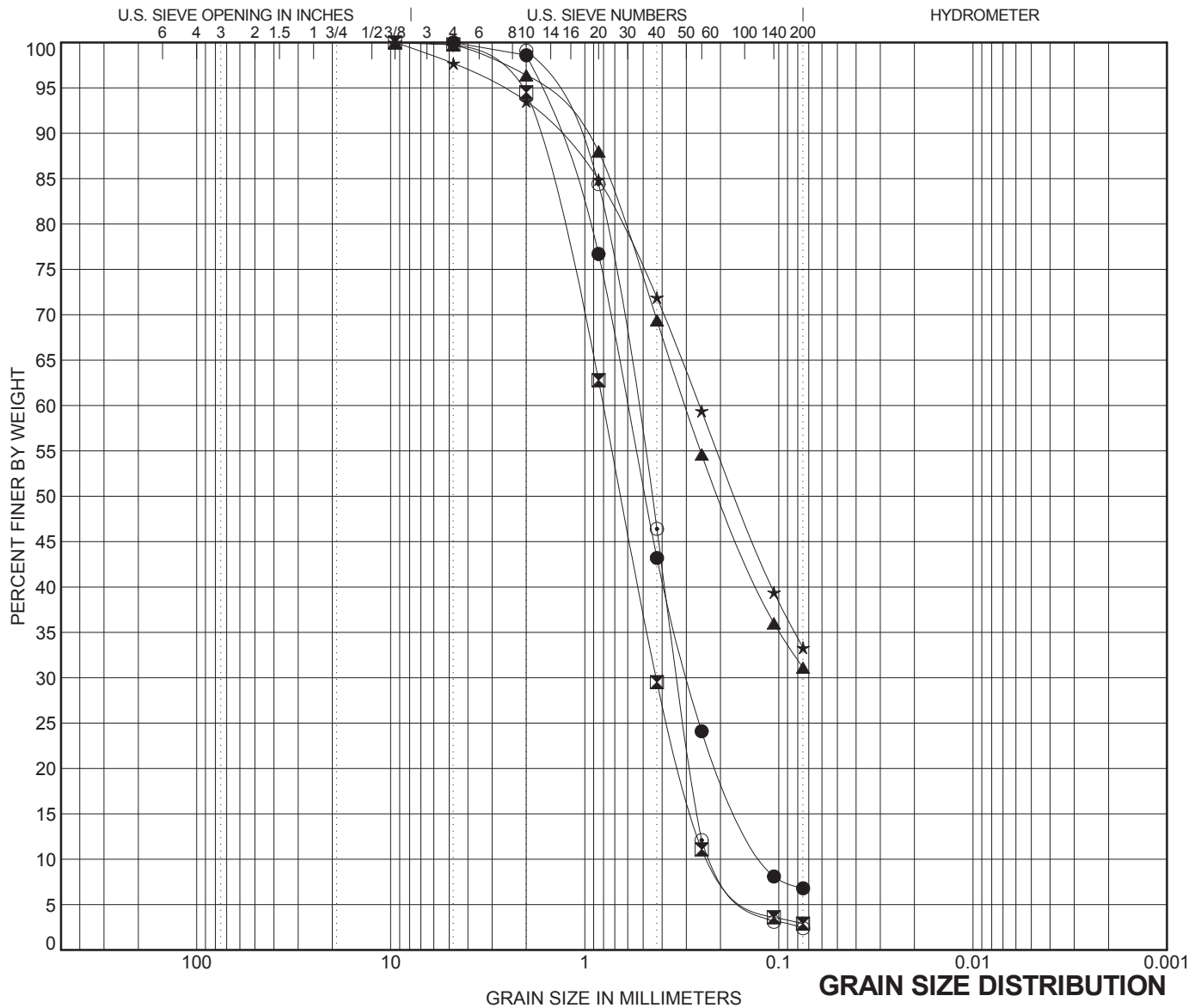


PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS ENGINEERING

Minimum ARRA-funded Segment
Merced to Fresno Section of the California High-Speed Train Project,

JOB NO:2009-138-400

PLATE NO: B-3B



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BORING SAMPLE # DEPTH (ft)				Classification					LL	PL	PI	Cc	Cu
●	S0002A	S04	16.0	Poorly graded SAND with SILT								1.23	5.13
⊠	S0002A	S06	26.0	Poorly graded SAND								1.04	3.64
▲	S0003A	S01	3.0	SILTY SAND									
★	S0003A	BULK	4.0	SILTY SAND									
⊙	S0003A	S04	16.0	Poorly graded SAND								0.98	2.66
BORING SAMPLE # DEPTH (ft)				D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	S0002A	S04	16.0	4.75	0.602	0.295	0.117	0.0	93.2	6.8			
⊠	S0002A	S06	26.0	9.5	0.802	0.429	0.22	0.2	96.9	2.9			
▲	S0003A	S01	3.0	9.5	0.303			0.3	68.6	31.1			
★	S0003A	BULK	4.0	9.5	0.256			2.3	64.4	33.3			
⊙	S0003A	S04	16.0	2	0.545	0.33	0.205		96.7	2.4			

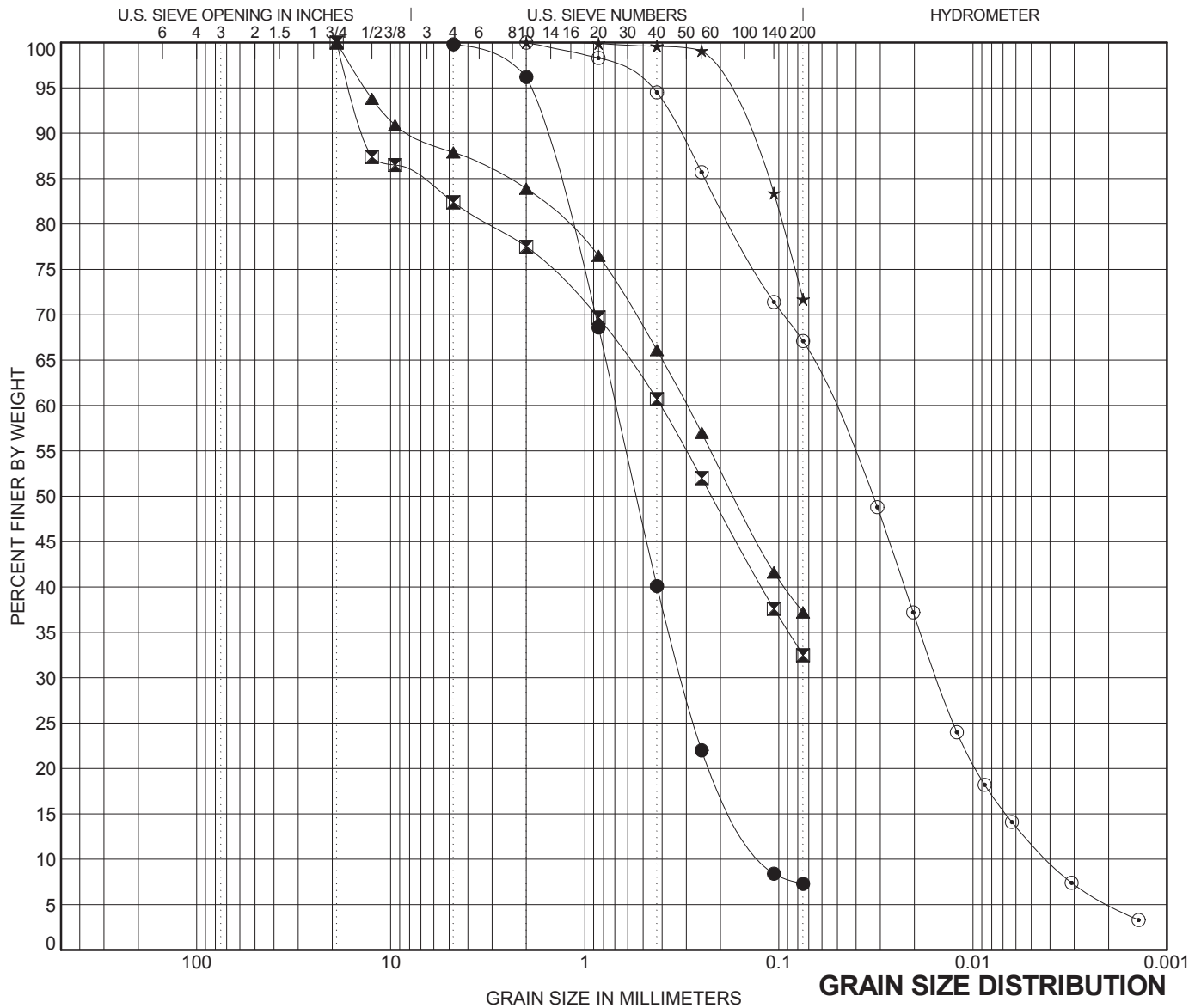


PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS ENGINEERING

Minimum ARRA-funded Segment
Merced to Fresno Section of the California High-Speed Train Project,

JOB NO:2009-138-400

PLATE NO: B-3C



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BORING SAMPLE # DEPTH (ft)				Classification				LL	PL	PI	Cc	Cu
●	S0003A	S06	26.0	Poorly graded SAND with SILT							1.24	5.88
⊠	S0005A	S01	3.0	SILTY SAND with GRAVEL								
▲	S0005A	BULK	4.0	SILTY SAND with GRAVEL								
★	S0005A	S03	11.0	SILT with SAND								
⊙	S0005A	S06	26.0	SANDY SILT							1.08	13.06
BORING SAMPLE # DEPTH (ft)				D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
●	S0003A	S06	26.0	4.75	0.69	0.316	0.117		92.5		7.3	
⊠	S0005A	S01	3.0	19	0.407			17.6	49.9		32.5	
▲	S0005A	BULK	4.0	19	0.298			12.1	50.7		37.2	
★	S0005A	S03	11.0	2				0.0	28.3		71.7	
⊙	S0005A	S06	26.0	2	0.053	0.015	0.004	0.0	32.9	55.2	11.9	

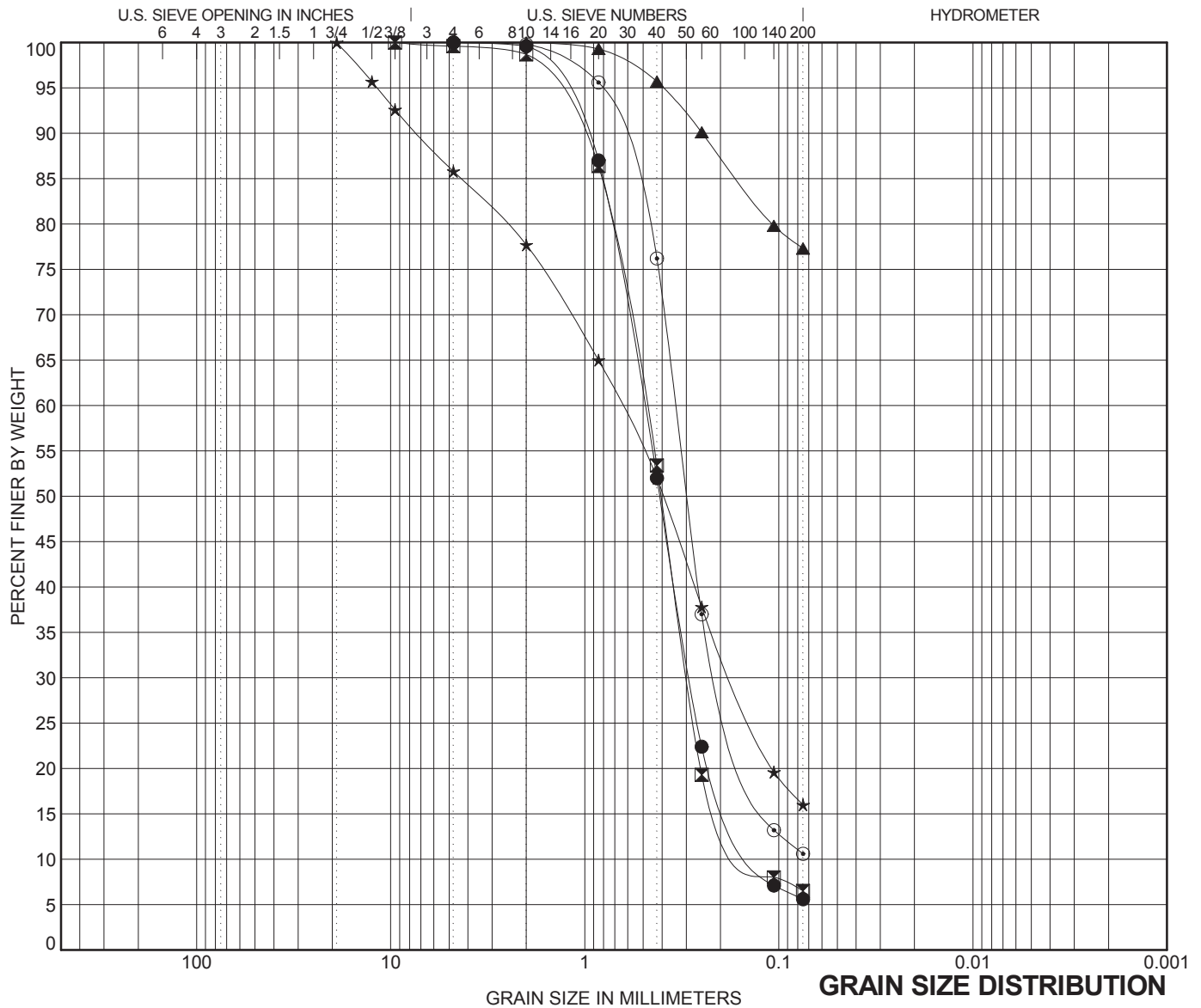


PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS ENGINEERING

Minimum ARRA-funded Segment
Merced to Fresno Section of the California High-Speed Train Project,

JOB NO:2009-138-400

PLATE NO: B-3D



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BORING SAMPLE # DEPTH (ft)				Classification				LL	PL	PI	Cc	Cu
●	S0005A	S09	41.0	Poorly graded SAND with SILT							1.32	3.99
⊠	S0005A	S12	56.0	Poorly graded SAND with SILT							1.45	3.96
▲	S0005A	S15	70.0									
★	S0005A	S17	81.0	SILTY SAND								
⊙	S0005A	S18	86.0	Poorly graded SAND with SILT							1.60	4.93
BORING SAMPLE # DEPTH (ft)				D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
●	S0005A	S09	41.0	4.75	0.498	0.286	0.125	0.0	94.4	5.6		
⊠	S0005A	S12	56.0	9.5	0.488	0.295	0.123	0.4	93.1	6.5		
▲	S0005A	S15	70.0	2				0.0	22.7	77.3		
★	S0005A	S17	81.0	19	0.651	0.173		14.2	69.8	16.0		
⊙	S0005A	S18	86.0	4.75	0.341	0.194		0.0	89.4	10.6		

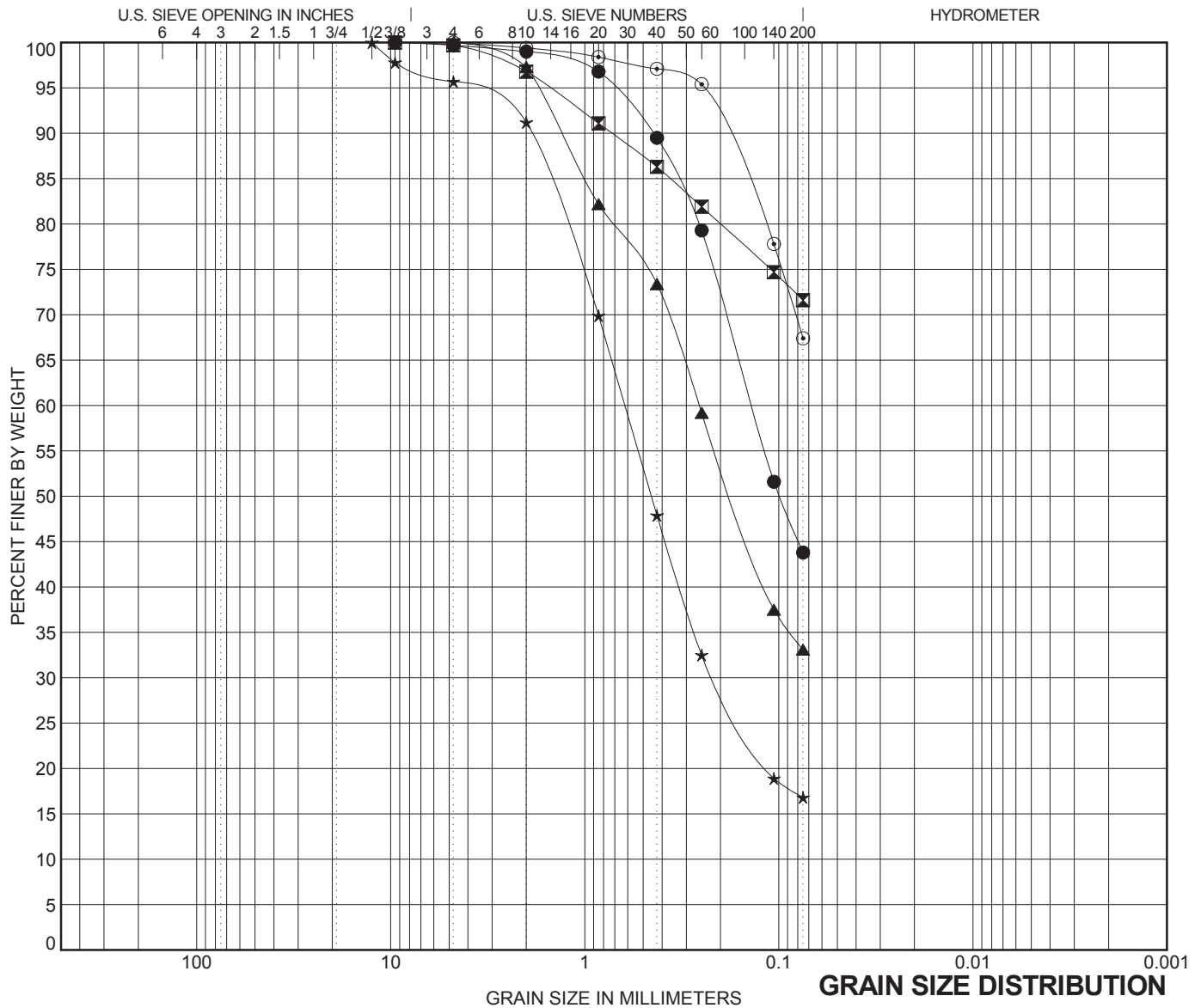


PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS ENGINEERING

Minimum ARRA-funded Segment
Merced to Fresno Section of the California High-Speed Train Project,

JOB NO:2009-138-400

PLATE NO: B-3E



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BORING SAMPLE # DEPTH (ft)				Classification				LL	PL	PI	Cc	Cu
●	S0005A	S21	101.0	SILTY SAND								
⊠	S0005A	S24	116.0	SILT with SAND								
▲	S0006A	BULK	4.0	SILTY SAND								
★	S0006A	S03	11.0	SILTY SAND								
⊙	S0006A	S06	26.0	SILTY SAND								
BORING SAMPLE # DEPTH (ft)				D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
●	S0005A	S21	101.0	9.5	0.138			0.3	55.9	43.8		
⊠	S0005A	S24	116.0	9.5				0.3	28.1	71.6		
▲	S0006A	BULK	4.0	4.75	0.258			0.0	66.9	33.1		
★	S0006A	S03	11.0	12.5	0.622	0.214		4.3	78.9	16.8		
⊙	S0006A	S06	26.0	4.75				0.0	32.6	67.4		

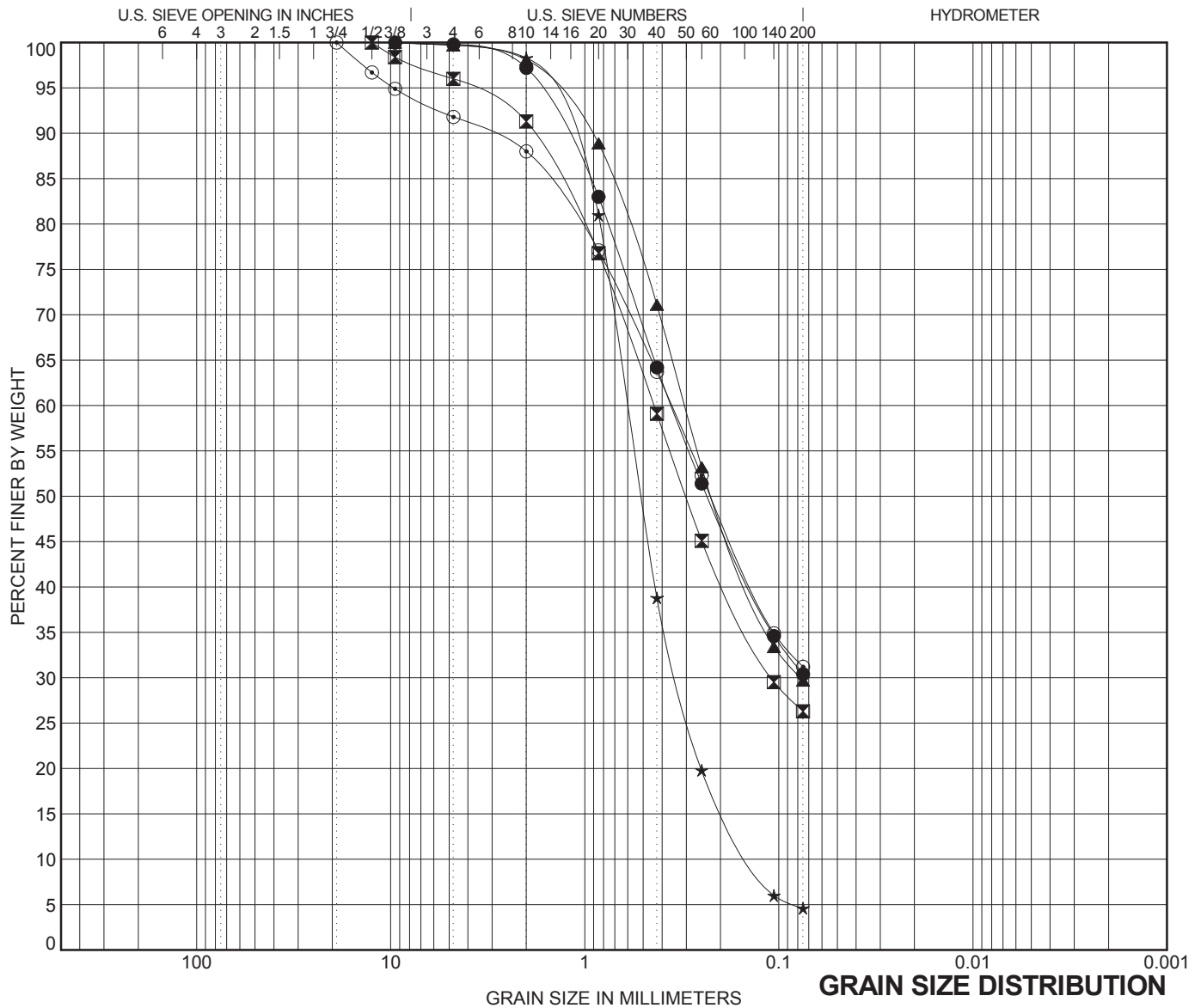


PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS ENGINEERING

Minimum ARRA-funded Segment
Merced to Fresno Section of the California High-Speed Train Project,

JOB NO:2009-138-400

PLATE NO: B-3F



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BORING SAMPLE # DEPTH (ft)				Classification				LL	PL	PI	Cc	Cu
●	S0007A	S01	3.0	SILTY SAND								
☒	S0007A	BULK	4.0	SILTY SAND								
▲	S0007A	S04	16.0	SILTY SAND								
★	S0007A	S06	26.0	SILTY SAND							1.35	4.43
⊙	S0008A	BULK	4.0	SILTY SAND								
BORING SAMPLE # DEPTH (ft)				D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
●	S0007A	S01	3.0	9.5	0.357			0.2	69.4	30.4		
☒	S0007A	BULK	4.0	12.5	0.44	0.109		4.0	69.7	26.3		
▲	S0007A	S04	16.0	9.5	0.306	0.077		0.3	70.0	29.7		
★	S0007A	S06	26.0	9.5	0.602	0.332	0.136	0.3	95.1	4.6		
⊙	S0008A	BULK	4.0	19	0.358			8.2	60.6	31.2		

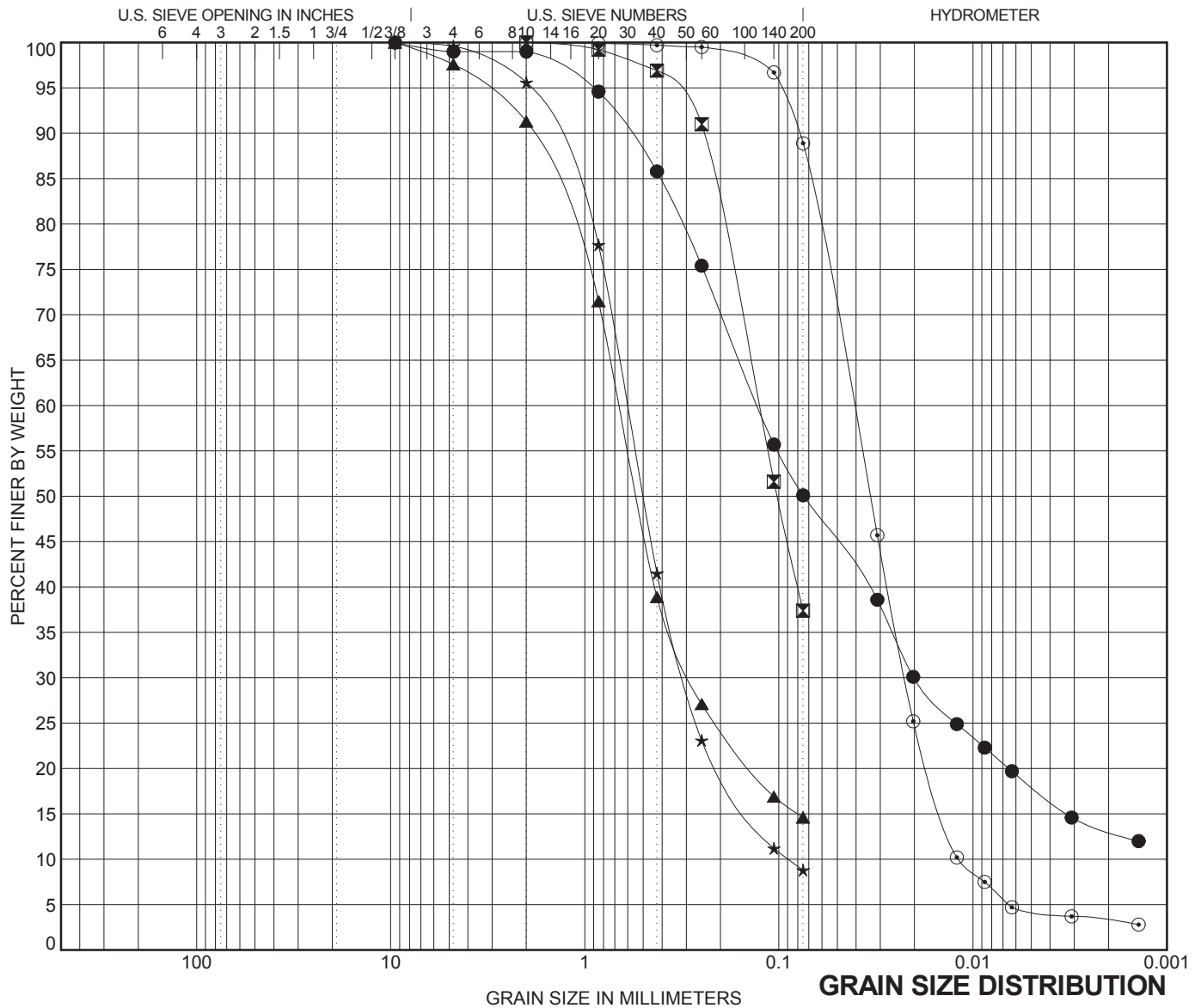


PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS ENGINEERING

Minimum ARRA-funded Segment
Merced to Fresno Section of the California High-Speed Train Project,

JOB NO:2009-138-400

PLATE NO: B-3G



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BORING SAMPLE # DEPTH (ft)				Classification				LL	PL	PI	Cc	Cu
●	S0008A	S02	6.0	SANDY SILT								
⊠	S0008A	S05	21.0	SILTY SAND								
▲	S0008A	S08	26.0	SILTY SAND								
★	S0008A	S11	51.0	Well-graded SAND with SILT							1.72	6.79
⊙	S0008A	S14	66.0	SILT							1.02	3.52
BORING SAMPLE # DEPTH (ft)				D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
●	S0008A	S02	6.0	9.5	0.128	0.02		1.0	48.9	32.1	18.0	
⊠	S0008A	S05	21.0	2	0.127			0.0	62.6	37.4		
▲	S0008A	S08	26.0	9.5	0.666	0.285		2.4	83.0	14.6		
★	S0008A	S11	51.0	9.5	0.606	0.305	0.089	0.4	90.8	8.8		
⊙	S0008A	S14	66.0	2	0.042	0.022	0.012	0.0	11.1	84.5	4.4	

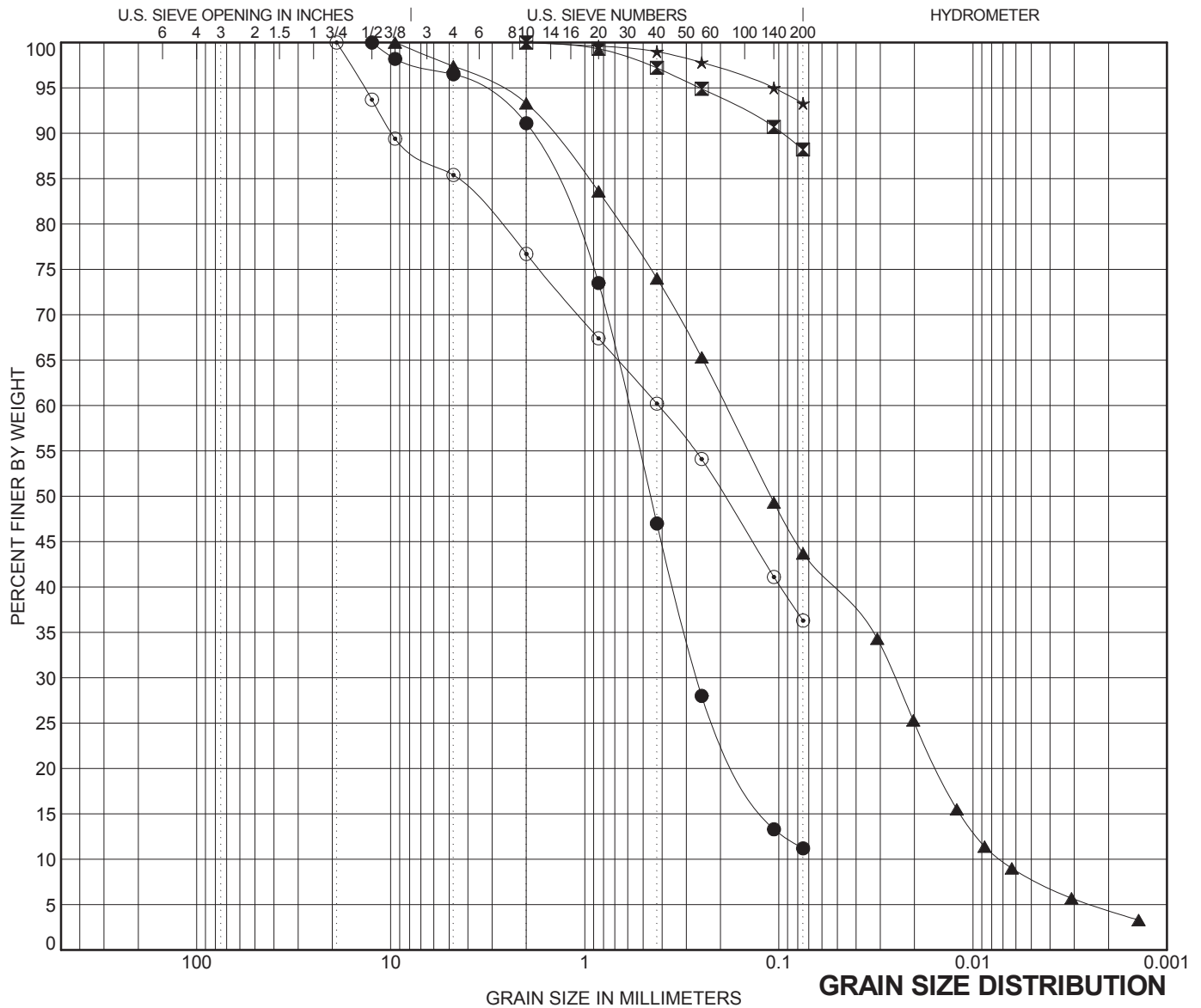


PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS ENGINEERING

Minimum ARRA-funded Segment
Merced to Fresno Section of the California High-Speed Train Project,

JOB NO:2009-138-400

PLATE NO: B-3H



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BORING SAMPLE # DEPTH (ft)				Classification				LL	PL	PI	Cc	Cu
●	S0009R	S04	16.0	Well-graded SAND with SILT							1.90	9.70
⊠	S0009R	S07	31.0	SILT								
▲	S0009R	S11	51.0	SILTY SAND							0.47	26.11
★	S0009R	S17	81.0	SILT								
⊙	S0009R	S18	86.0	CLAYEY SAND								
BORING SAMPLE # DEPTH (ft)				D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
●	S0009R	S04	16.0	12.5	0.597	0.264		3.5	85.3	11.2		
⊠	S0009R	S07	31.0	2				0.0	11.8	88.2		
▲	S0009R	S11	51.0	9.5	0.188	0.025	0.007	2.6	53.7	35.8	7.9	
★	S0009R	S17	81.0	2				0.0	6.7	93.3		
⊙	S0009R	S18	86.0	19	0.418			14.6	49.1	36.3		

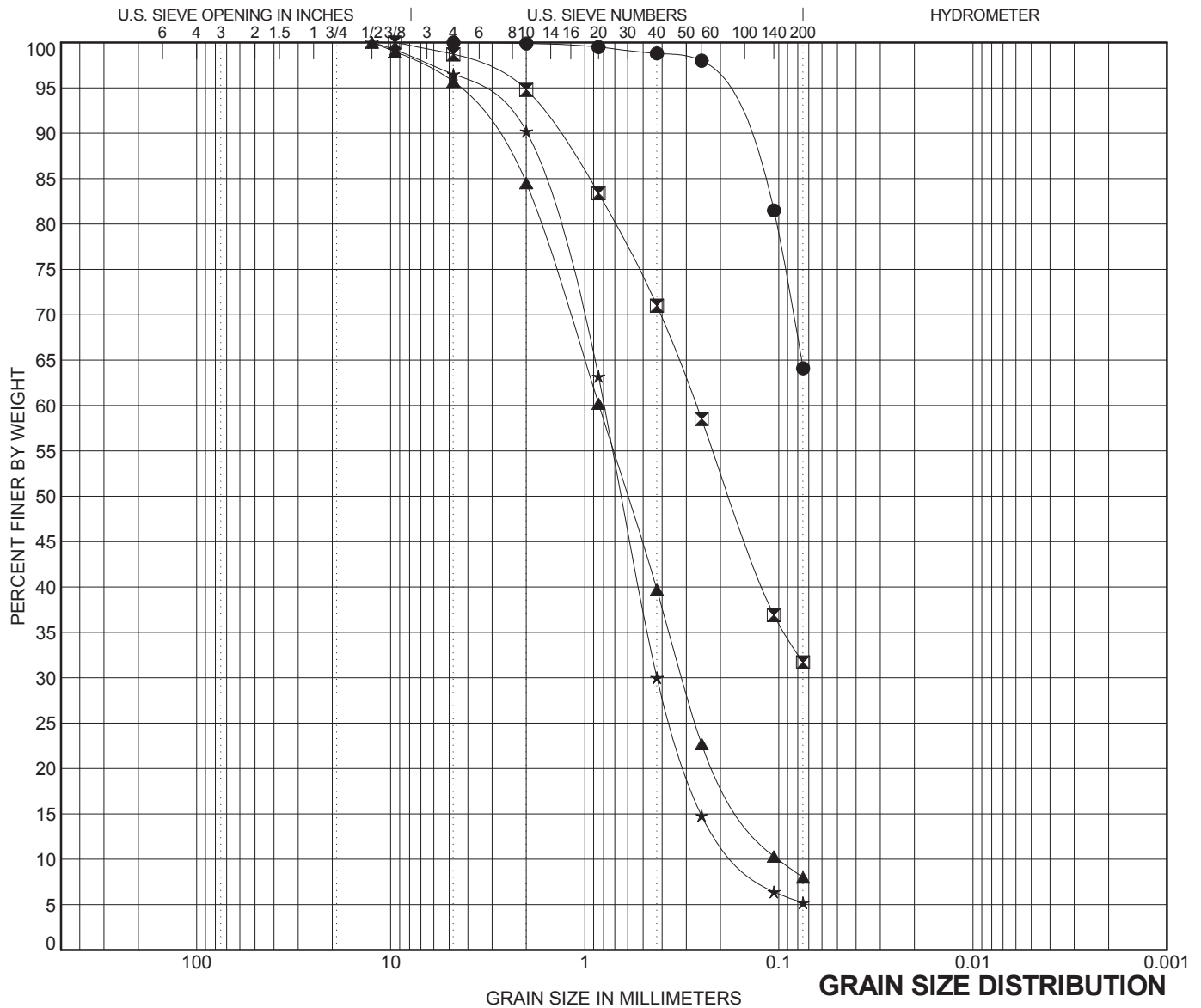


PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS ENGINEERING

Minimum ARRA-funded Segment
Merced to Fresno Section of the California High-Speed Train Project,

JOB NO:2009-138-400

PLATE NO: B-3J



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BORING SAMPLE #	DEPTH (ft)	Classification	LL	PL	PI	Cc	Cu
● S0009R S20	96.0	SANDY SILT					
☒ S0010A BULK	4.0	SILTY SAND					
▲ S0010A S03	11.0	Poorly graded SAND with SILT				1.15	8.33
★ S0010A S06	26.0	Poorly graded SAND with SILT				1.48	5.19

BORING SAMPLE #	DEPTH (ft)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● S0009R S20	96.0	4.75				0.0	35.9	64.1	
☒ S0010A BULK	4.0	9.5	0.266			1.3	67.0	31.7	
▲ S0010A S03	11.0	12.5	0.844	0.314	0.101	4.3	87.7	8.0	
★ S0010A S06	26.0	12.5	0.795	0.425	0.153	3.5	91.3	5.2	



PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS ENGINEERING

Minimum ARRA-funded Segment
Merced to Fresno Section of the California High-Speed Train Project,

JOB NO:2009-138-400

PLATE NO: B-3K

Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils (Quick Undrained)



Client	AECOM	Lab Ref	G757
Project	CALIFORNIA HIGH-SPEED TRAIN PROJECT	Job	2009-138- 400
Borehole	S0001A	Sample	S12

Test & Sample Details			
Standard	ASTM D2850-95 / AASHTO T296-94	Sample Depth	56.00 ft
Sample Type	Modified California Sampler	Sp. Gravity of Solids	2.65
Sample Description	Silt, yellowish brown	Lab. Temperature	75.4 deg.F
Variations from Procedure	None		

Specimen Details			
Specimen Reference	A	Stage Reference	1
Initial Height	5.0000 in	Description	
Initial Diameter	2.4160 in	Depth within Sample	0.0000 in
Initial Dry Unit Weight	99.30 lbf/ft ³	Orientation within Sample	
Initial Moisture Content*	24.7 % (trimmings: 23.6 %)	Preparation	
Void Ratio	0.67	Degree of Saturation	98.21%
Comments			

* Calculated from initial and dry weights of whole specimen

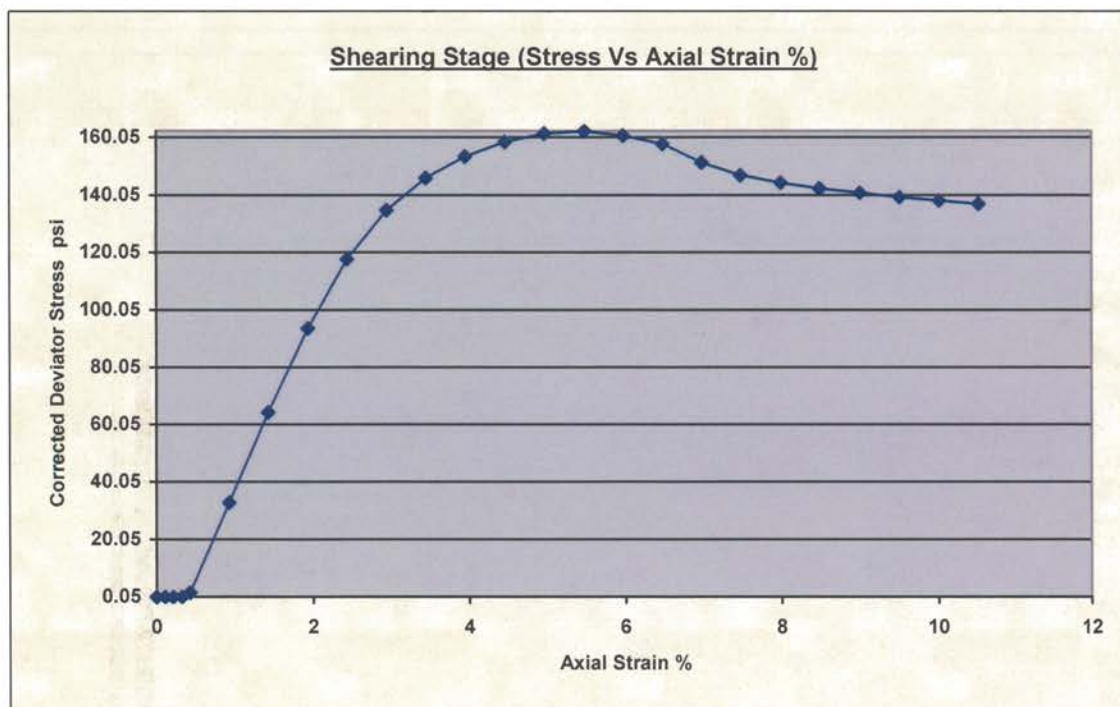


PLATE NO: B-4A-1

Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils (Quick Undrained)



Client	AECOM	Lab Ref	G757
Project	CALIFORNIA HIGH-SPEED TRAIN PROJECT	Job	2009-138- 400
Borehole	S0001A	Sample	S12

Shear Conditions			
Rate of Axial Strain	0.30%/min	Cell Pressure	48.58psi
Conditions at Failure			
Failure Criterion	Maximum Deviator Stress		
Compressive Strength	162.28 psi	Major Principal Stress	210.86 psi
Axial Strain	5.47%	Minor Principal Stress	48.58 psi
Deviator Stress Correction Applied	0.220psi	Final Moisture Content	24.6 %
Final Unit Weight	123.68 lbf/ft ³		



Tested By and Date:	P Dayah 11/10/11
Checked By and Date:	
Approved By and Date:	

Mode of Failure

**Sunland Analytical**

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 12/07/2011
Date Submitted 12/01/2011

To: Prav Dayah
Parikh Consultants, Inc.
2360 Qume Dr, Ste.A
San Jose, CA 95131

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2009-138-400/CA.HSTP Site ID : S0001A#S02 @ 6'.
Thank you for your business.

* For future reference to this analysis please use SUN # 61450-126289.

EVALUATION FOR SOIL CORROSION

Soil pH	6.31	
Minimum Resistivity	2.60 ohm-cm (x1000)	
Chloride	40.5 ppm	00.00405 %
Sulfate	26.6 ppm	00.00266 %

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

**Sunland Analytical**

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 12/07/2011
Date Submitted 12/01/2011

To: Prav Dayah
Parikh Consultants, Inc.
2360 Qume Dr, Ste.A
San Jose, CA 95131

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2009-138-400/CA.HSTP Site ID : S0002A#S02 @ 6'.
Thank you for your business.

* For future reference to this analysis please use SUN # 61450-126290.

EVALUATION FOR SOIL CORROSION

Soil pH	6.56	
Minimum Resistivity	5.36 ohm-cm (x1000)	
Chloride	5.4 ppm	00.00054 %
Sulfate	0.8 ppm	00.00008 %

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

**Sunland Analytical**

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 12/07/2011
Date Submitted 12/01/2011

To: Prav Dayah
Parikh Consultants, Inc.
2360 Qume Dr, Ste.A
San Jose, CA 95131

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2009-138-400/CA.HSTP Site ID : S0003A#S02 @ 6'.
Thank you for your business.

* For future reference to this analysis please use SUN # 61450-126291.

EVALUATION FOR SOIL CORROSION

Soil pH	7.84		
Minimum Resistivity	2.95 ohm-cm (x1000)		
Chloride	10.4 ppm	00.00104	%
Sulfate	25.8 ppm	00.00258	%

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 12/07/2011
Date Submitted 12/01/2011

To: Prav Dayah
Parikh Consultants, Inc.
2360 Qume Dr, Ste.A
San Jose, CA 95131

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2009-138-400/CA.HSTP Site ID : S0005A#S02 @ 6'.
Thank you for your business.

* For future reference to this analysis please use SUN # 61450-126296.

EVALUATION FOR SOIL CORROSION

Soil pH	8.16	
Minimum Resistivity	0.99 ohm-cm (x1000)	
Chloride	27.3 ppm	00.00273 %
Sulfate	45.4 ppm	00.00454 %

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

**Sunland Analytical**

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 12/07/2011
Date Submitted 12/01/2011

To: Prav Dayah
Parikh Consultants, Inc.
2360 Qume Dr. Ste.A
San Jose, CA 95131

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2009-138-400/CA.HSTP Site ID : S0006A#2 @ 6'.
Thank you for your business.

* For future reference to this analysis please use SUN # 61450-126292.

EVALUATION FOR SOIL CORROSION

Soil pH	7.83	
Minimum Resistivity	7.50 ohm-cm (x1000)	
Chloride	14.0 ppm	00.00140 %
Sulfate	15.8 ppm	00.00158 %

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

**Sunland Analytical**

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 12/07/2011
Date Submitted 12/01/2011

To: Prav Dayah
Parikh Consultants, Inc.
2360 Qume Dr, Ste.A
San Jose, CA 95131

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2009-138-400/CA.HSTP Site ID : S0007A#2 @ 6'.
Thank you for your business.

* For future reference to this analysis please use SUN # 61450-126294.

EVALUATION FOR SOIL CORROSION

Soil pH	8.09	
Minimum Resistivity	3.75 ohm-cm (x1000)	
Chloride	8.2 ppm	00.00082 %
Sulfate	15.0 ppm	00.00150 %

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

**Sunland Analytical**

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 12/07/2011
Date Submitted 12/01/2011

To: Prav Dayah
Parikh Consultants, Inc.
2360 Gume Dr, Ste.A
San Jose, CA 95131

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2009-138-400/CA.HSTP Site ID : S0008A#S03 @ 11.
Thank you for your business.

* For future reference to this analysis please use SUN # 61450-126293.

EVALUATION FOR SOIL CORROSION

Soil pH	7.41	
Minimum Resistivity	3.22 ohm-cm (x1000)	
Chloride	13.6 ppm	00.00136 %
Sulfate	11.9 ppm	00.00119 %

METHODS

pH and Min. Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

**Sunland Analytical**

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 12/07/2011
Date Submitted 12/01/2011

To: Prav Dayah
Parikh Consultants, Inc.
2360 Qume Dr, Ste.A
San Jose, CA 95131

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2009-138-400/CA.HSTP Site ID : S0009A#2 @ 6'.
Thank you for your business.

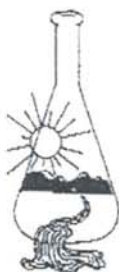
* For future reference to this analysis please use SUN # 61450-126295.

EVALUATION FOR SOIL CORROSION

Soil pH	8.88		
Minimum Resistivity	5.90 ohm-cm (x1000)		
Chloride	6.1 ppm	00.00061	%
Sulfate	10.0 ppm	00.00100	%

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

**Sunland Analytical**

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 12/07/2011
Date Submitted 12/01/2011

To: Prav Dayah
Parikh Consultants, Inc.
2360 Qume Dr, Ste.A
San Jose, CA 95131

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2009-138-400/CA.HSTP Site ID : S0010A#S02 @ 6'.
Thank you for your business.

* For future reference to this analysis please use SUN # 61450-126297.

EVALUATION FOR SOIL CORROSION

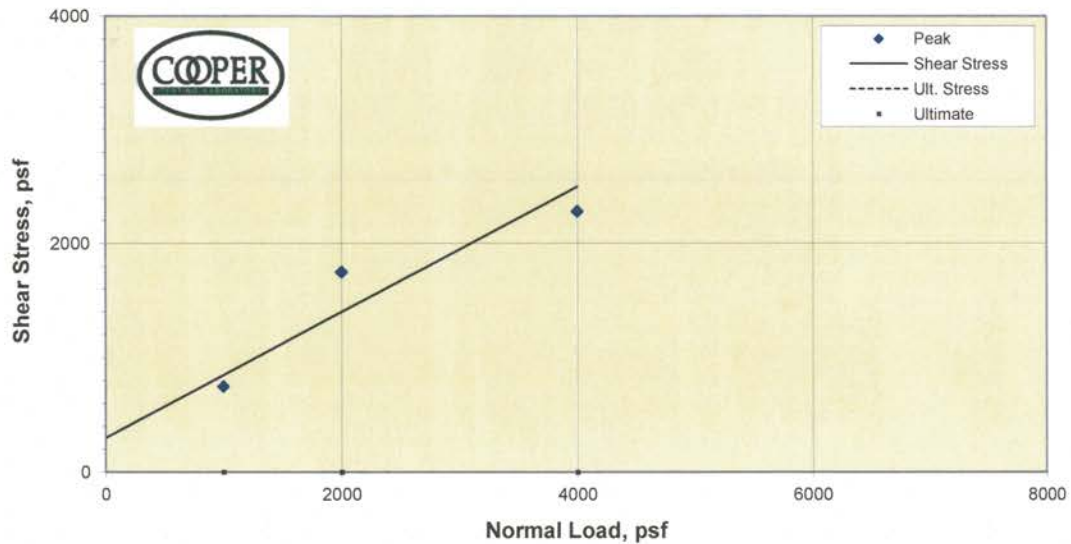
Soil pH	7.38		
Minimum Resistivity	13.40	ohm-cm (x1000)	
Chloride	6.0 ppm	00.00060	%
Sulfate	0.1 ppm	00.00001	%

METHODS

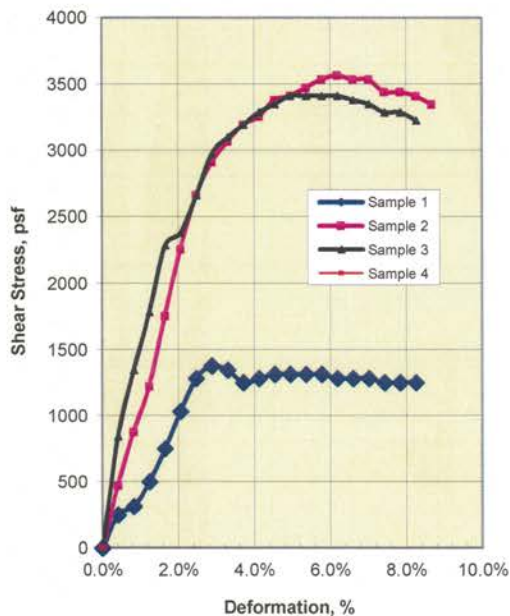
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

Direct Shear

(Consolidated-Undrained)



P. Phi (degrees)	28.8	Ult. Phi (degrees)	
P. Cohesion (psf)	300	Ult. Cohesion (psf)	



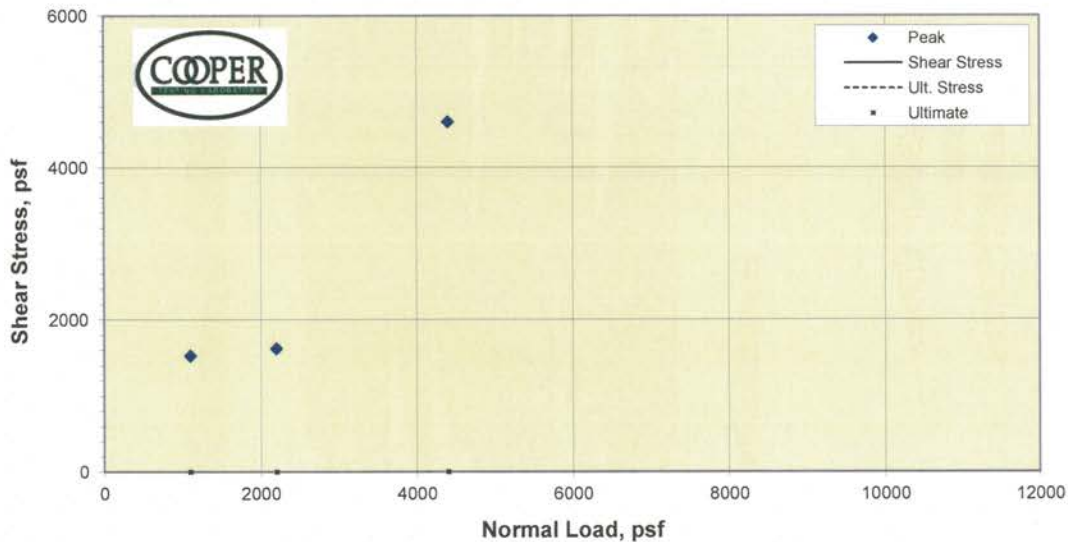
Sample Data: Initial				
	1	2	3	4
Moisture %	4.2%	4.4%	8.2%	
Dry Dens., pcf	93.4	96.4	93.6	
Void Ratio	0.804	0.749	0.801	
Saturation %	14.3	15.7	27.7	
Diameter	2.42	2.42	2.42	
Height	1.00	1.00	1.00	
Sample Data: At Test				
Moisture %	28.4%	26.4%	25.4%	
Dry Dens., pcf	95.4	98.4	100.1	
Void Ratio	0.768	0.714	0.685	
Saturation %	100.0	100.0	100.0	
Diameter	2.42	2.42	2.42	
Height	0.979	0.979	0.935	
Normal Stress, psf	1000	2000	4000	
Shear Stress, psf	751	1753	2285	
Strengths picked at	2.0%	2.0%	2.0%	
Ult. Stress, psf				
Strain Rate, %/min.	1.0	1.0	1.0	
CTL #	157-298			
Client:	Parikh Consultants, Inc.			
Project	California High-Speed Train Project			
Tested By:	MD			
Reduced By:	JC			
Date:	12/6/2011			

Specimen #	Boring:	Sample:	Depth, ft:	Visual Soil Classification
1	S0001A	S10	46	Olive Brown Silty SAND w/ Gravel
2	S0001A	S10	46	Olive Brown Silty SAND w/ Gravel
3	S0001A	S10	46	Olive Brown Silty SAND w/ Gravel
Remarks: Strengths were picked at 2% strain because the 2000 psf point exceeded the strength of the 3000 psf point after 2% strain.				
DS-CU A fully undrained condition may not be attained in this test.				

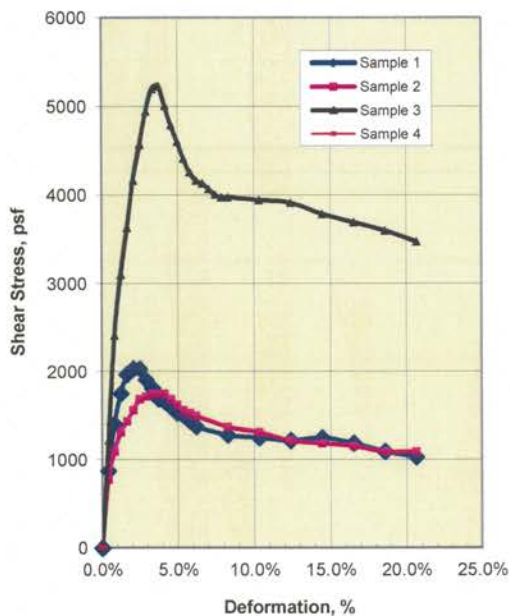
Plate No: B-6A

Direct Shear

(Consolidated-Undrained)



P. Phi (degrees)		Ult. Phi (degrees)	
P. Cohesion (psf)		Ult. Cohesion (psf)	



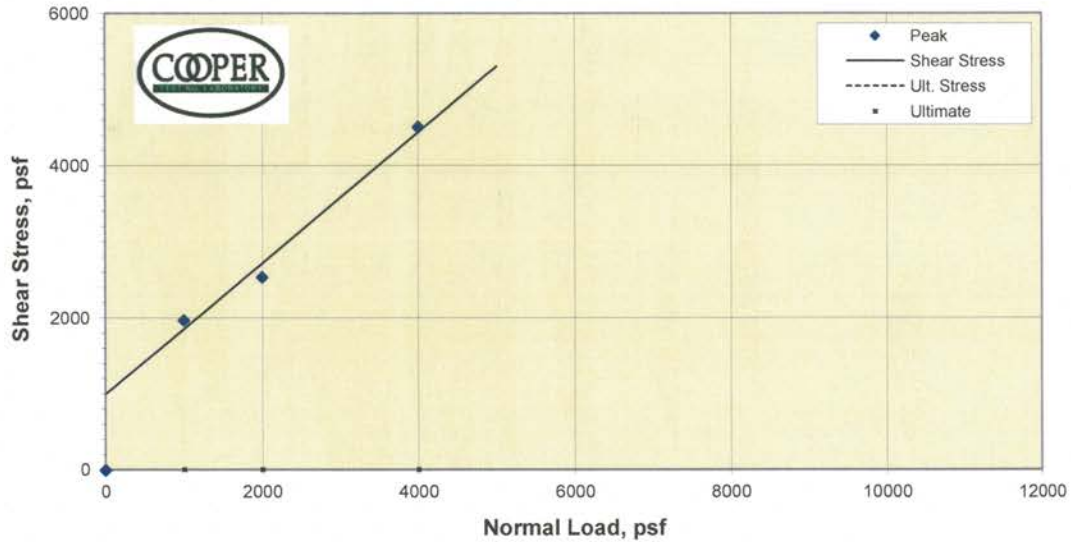
Sample Data: Initial			
	1	2	3
Moisture %	11.9%	10.7%	11.5%
Dry Dens., pcf	116.5	108.5	119.5
Void Ratio	0.447	0.553	0.411
Saturation %	71.9	52.4	75.8
Diameter	2.42	2.42	2.42
Height	1.00	1.00	1.00
Sample Data: At Test			
Moisture %	15.3%	17.5%	14.2%
Dry Dens., pcf	119.3	114.6	121.8
Void Ratio	0.413	0.471	0.384
Saturation %	100.0	100.0	100.0
Diameter	2.42	2.42	2.42
Height	0.976	0.947	0.981
Normal Stress, psf	1100	2200	4400
Shear Stress, psf	1534	1628	4602
Strengths picked at Ult. Stress, psf	5.0%	5.0%	5.0%
Strain Rate, %/min.	1.0	1.0	1.0
CTL #	157-298		
Client:	Parikh Consultants, Inc.		
Project	California High-Speed Train Project		
Tested By:	MD		
Reduced By:	JC		
Date:	12/6/2011		

Specimen #	Boring	Sample	Depth, ft.	Visual Soil Classification
1	S0001A	S14	66	Reddish Brown Silty SAND (slightly plastic)
2	S0001A	S14	66	Reddish Brown Silty SAND (slightly plastic)
3	S0001A	S14	66	Reddish Brown Silty SAND (slightly plastic)
Remarks:				
DS-CU A fully undrained condition may not be attained in this test.				

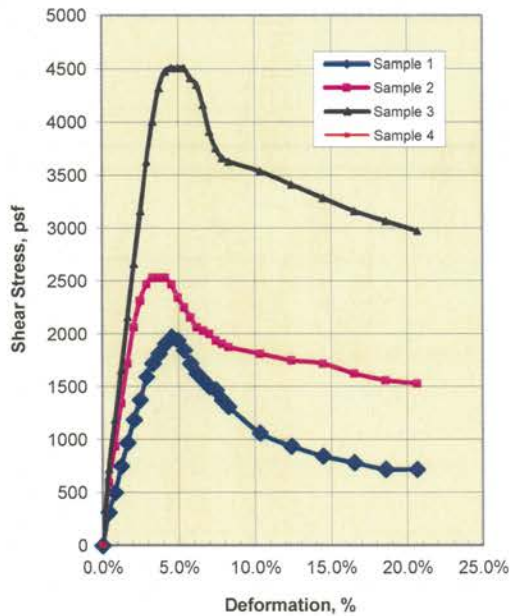
Plate No: B-6B

Direct Shear

(Consolidated-Undrained)



P. Phi (degrees)	40.7	Ult. Phi (degrees)	
P. Cohesion (psf)	1000	Ult. Cohesion (psf)	



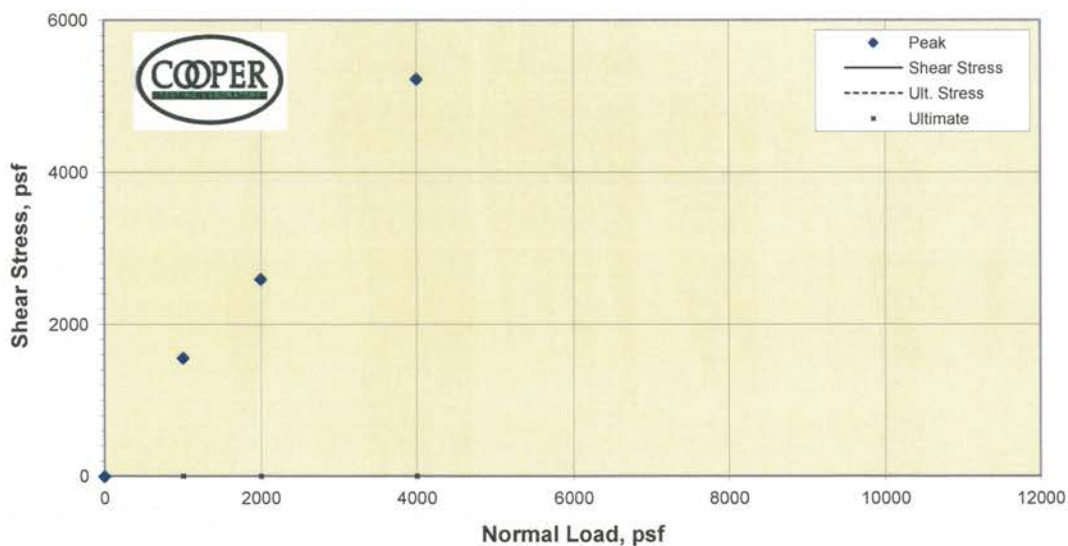
Sample Data: Initial				
	1	2	3	4
Moisture %	29.2%	23.3%	25.1%	
Dry Dens., pcf	88.8	96.4	95.1	
Void Ratio	0.898	0.749	0.773	
Saturation %	87.7	83.8	87.7	
Diameter	2.42	2.42	2.42	
Height	1.00	1.00	1.00	
Sample Data: At Test				
Moisture %	29.9%	24.5%	26.1%	
Dry Dens., pcf	93.3	101.4	98.9	
Void Ratio	0.807	0.663	0.706	
Saturation %	100.0	100.0	100.0	
Diameter	2.42	2.42	2.42	
Height	0.952	0.950	0.961	
Normal Stress, psf	1000	2000	4000	
Shear Stress, psf	1972	2536	4508	
Strengths picked at	Peak	Peak	Peak	
Ult. Stress, psf				
Strain Rate, %/min.	1.0	1.0	1.0	
CTL #	157-298			
Client:	Parikh Consultants, Inc.			
Project	California High-Speed Train Project			
Tested By:	MD			
Reduced By:	JC			
Date:	12/6/2011			

Specimen #	Boring:	Sample:	Depth, ft:	Visual Soil Classification
1	S0001A	S23	111	Light Olive Brown Silty SAND
2	S0001A	S23	111	Light Olive Brown Silty SAND
3	S0001A	S23	111	Light Olive Brown Silty SAND
Remarks:	*DS-CU* A fully undrained condition may not be attained in this test.			

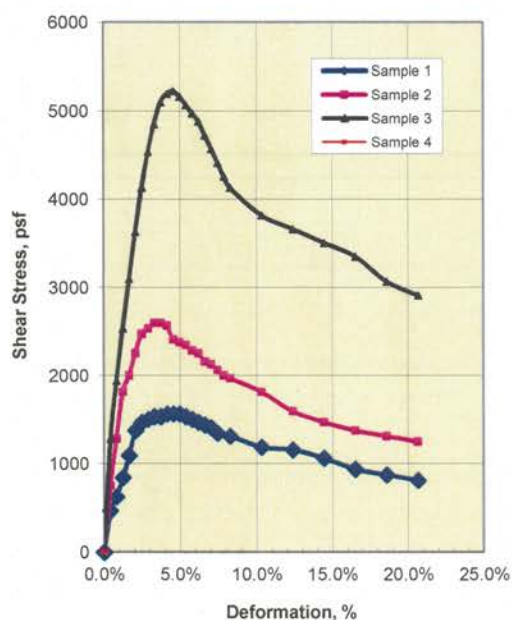
Plate No: B-6C

Direct Shear

(Consolidated-Undrained)



P. Phi (degrees)		Ult. Phi (degrees)	
P. Cohesion (psf)		Ult. Cohesion (psf)	



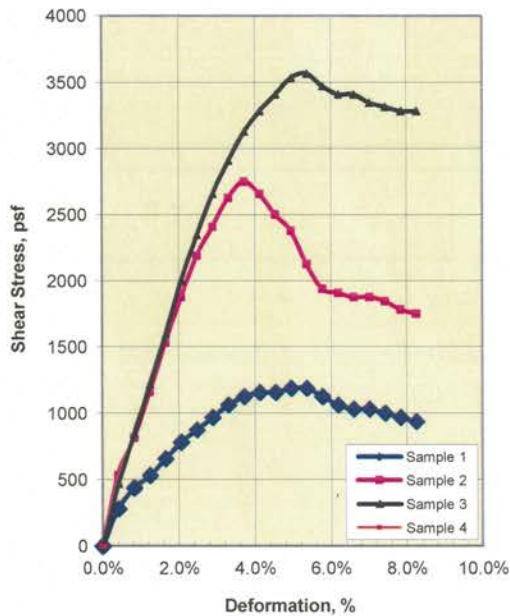
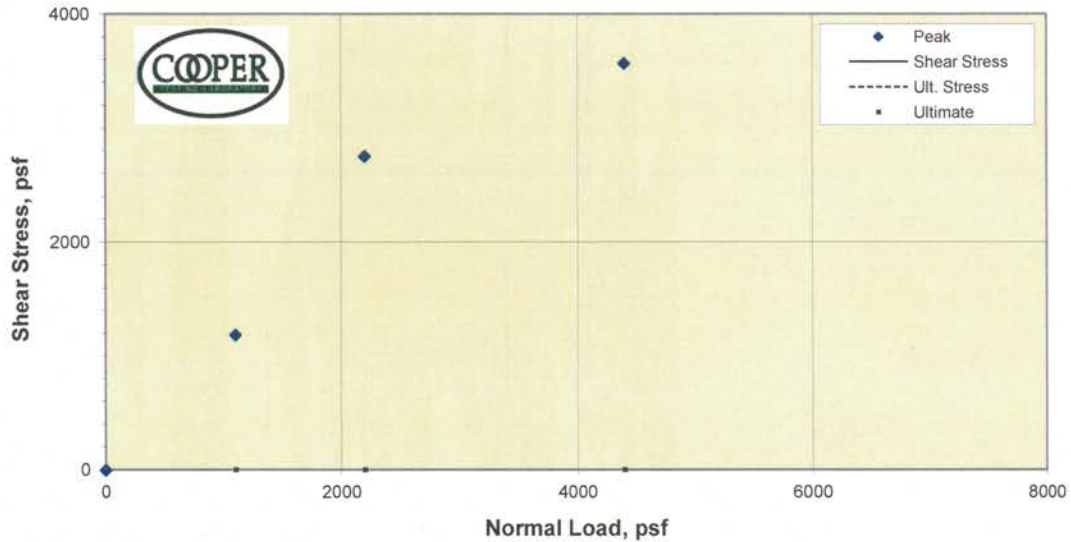
	Sample Data: Initial			
	1	2	3	4
Moisture %	9.1%	10.7%	12.2%	
Dry Dens., pcf	112.2	115.9	118.8	
Void Ratio	0.502	0.454	0.419	
Saturation %	48.9	63.5	78.9	
Diameter	2.42	2.42	2.42	
Height	1.00	1.00	1.00	
	Sample Data: At Test			
Moisture %	13.7%	13.0%	12.4%	
Dry Dens., pcf	123.0	124.8	126.3	
Void Ratio	0.371	0.352	0.336	
Saturation %	100.0	100.0	100.0	
Diameter	2.42	2.42	2.42	
Height	0.912	0.929	0.941	
Normal Stress, psf	1000	2000	4000	
Shear Stress, psf	1565	2598	5228	
Strengths picked at	Peak	Peak	Peak	
Ult. Stress, psf				
Strain Rate, %/min.	1.0	1.0	1.0	
CTL #	157-298			
Client:	Parikh Consultants, Inc.			
Project	California High-Speed Train Project			
Tested By:	MD			
Reduced By:	JC			
Date:	12/6/2011			

Specimen #	Boring:	Sample:	Depth, ft:	Visual Soil Classification
1	S0002A	S03	11	Brown Silty SAND
2	S0002A	S03	11	Brown Silty SAND
3	S0002A	S03	11	Brown Silty SAND
Remarks: The friction angle exceeded 45 degrees, possible due to the angularity of the sand.				
DS-CU A fully undrained condition may not be attained in this test.				

Plate No: B-6D

Direct Shear

(Consolidated-Undrained)



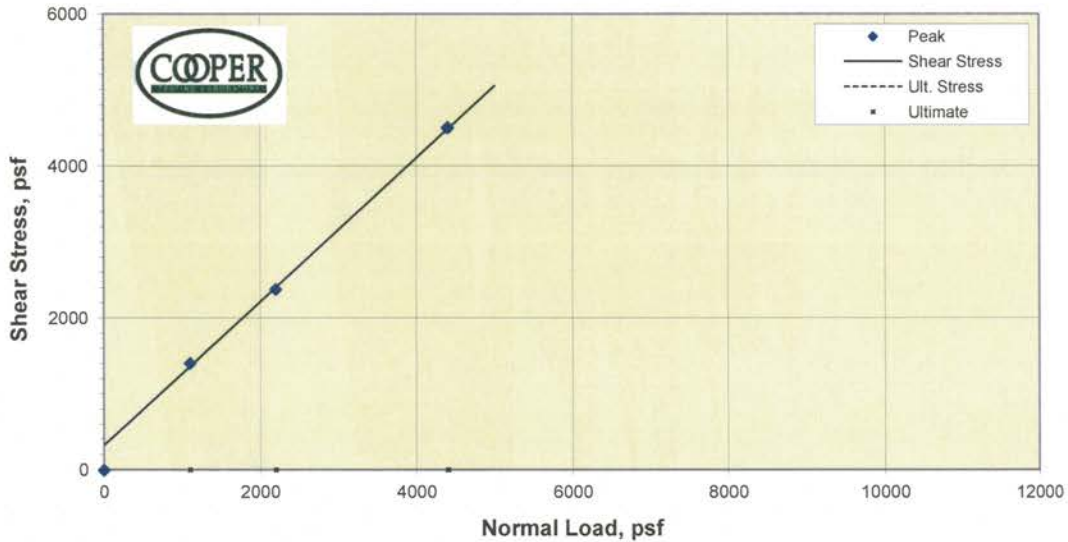
P. Phi (degrees)		Ult. Phi (degrees)	
P. Cohesion (psf)		Ult. Cohesion (psf)	
Sample Data: Initial			
	1	2	3
Moisture %	14.5%	12.9%	13.0%
Dry Dens., pcf	96.3	99.8	100.3
Void Ratio	0.751	0.690	0.681
Saturation %	52.2	50.6	51.6
Diameter	2.42	2.42	2.42
Height	1.00	1.00	1.00
Sample Data: At Test			
Moisture %	25.4%	22.1%	22.7%
Dry Dens., pcf	100.1	105.6	104.6
Void Ratio	0.685	0.598	0.612
Saturation %	100.0	100.0	100.0
Diameter	2.42	2.42	2.42
Height	0.961	0.945	0.958
Normal Stress, psf	1100	2200	4400
Shear Stress, psf	1190	2755	3569
Strengths picked at Ult. Stress, psf	Peak	Peak	Peak
Strain Rate, %/min.	1.0	1.0	1.0
CTL #	157-298		
Client:	Parikh Consultants, Inc.		
Project	California High-Speed Train Project		
Tested By:	MD		
Reduced By:	JC		
Date:	12/6/2011		

Specimen #	Boring	Sample	Depth, ft:	Visual Soil Classification
1	S0003A	S03	11	Light Brown Silty SAND
2	S0003A	S03	11	Light Brown Silty SAND
3	S0003A	S03	11	Light Brown Silty SAND
Remarks:				
DS-CU A fully undrained condition may not be attained in this test.				

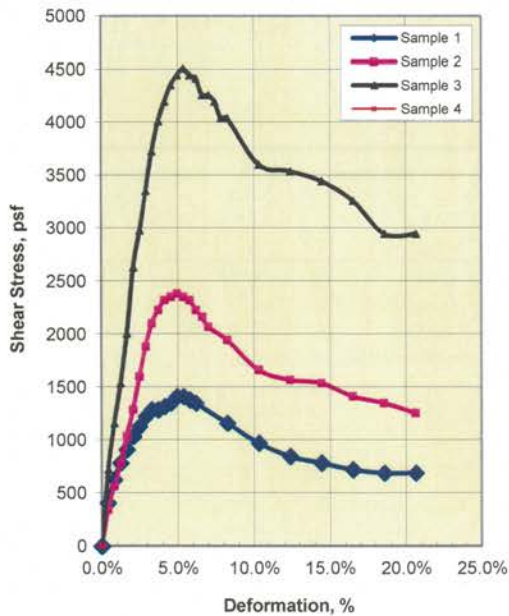
Plate No: B-6E

Direct Shear

(Consolidated-Undrained)



P. Phi (degrees)	43.4	Ult. Phi (degrees)	
P. Cohesion (psf)	325	Ult. Cohesion (psf)	



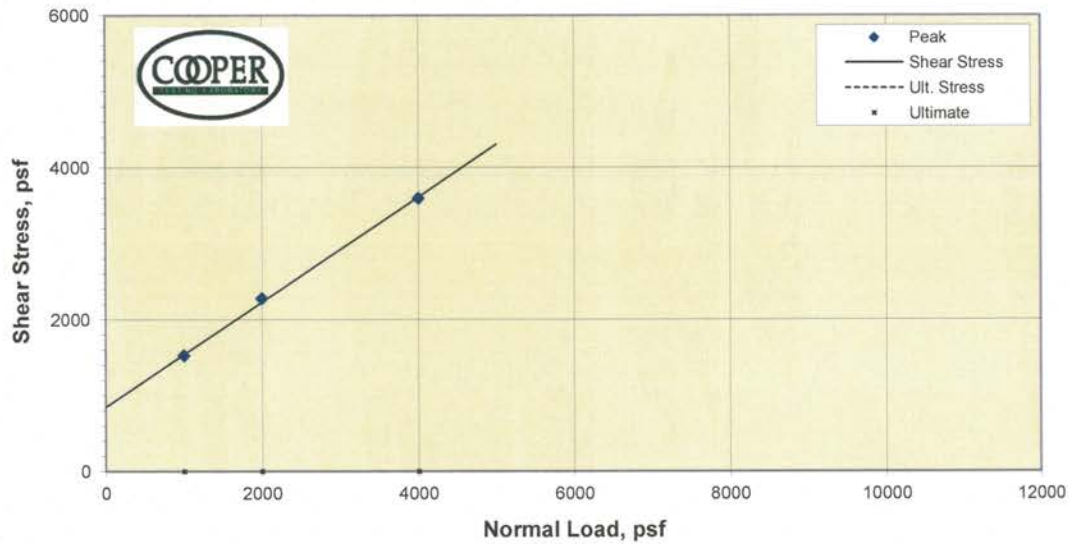
Sample Data: Initial			
	1	2	3
Moisture %	3.4%	3.8%	3.4%
Dry Dens., pcf	100.3	100.0	102.3
Void Ratio	0.681	0.685	0.648
Saturation %	13.5	15.1	14.2
Diameter	2.42	2.42	2.42
Height	1.00	1.00	1.00
Sample Data: At Test			
Moisture %	19.3%	19.2%	18.8%
Dry Dens., pcf	110.8	111.0	111.9
Void Ratio	0.522	0.519	0.507
Saturation %	100.0	100.0	100.0
Diameter	2.42	2.42	2.42
Height	0.905	0.901	0.914
Normal Stress, psf	1100	2200	4400
Shear Stress, psf	1409	2379	4508
Strengths picked at	Peak	Peak	Peak
Ult. Stress, psf			
Strain Rate, %/min.	1.0	1.0	1.0
CTL #	157-298		
Client:	Parikh Consultants, Inc.		
Project	California High-Speed Train Project		
Tested By:	MD		
Reduced By:	JC		
Date:	12/6/2011		

Specimen #	Boring:	Sample:	Depth, ft:	Visual Soil Classification
1	S0005A	7	31	Light Brown SAND
2	S0005A	7	31	Light Brown SAND
3	S0005A	7	31	Light Brown SAND
Remarks:				
DS-CU A fully undrained condition may not be attained in this test.				

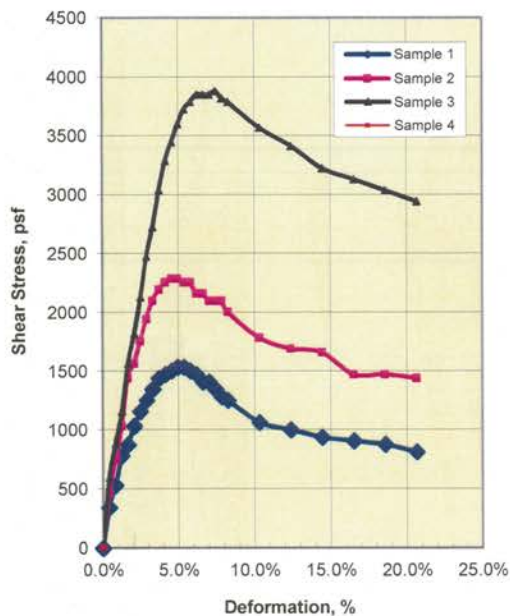
Plate No: B-6F

Direct Shear

(Consolidated-Undrained)



P. Phi (degrees)	34.6	Ult. Phi (degrees)	
P. Cohesion (psf)	850	Ult. Cohesion (psf)	



Sample Data: Initial				
	1	2	3	4
Moisture %	6.6%	8.6%	13.1%	
Dry Dens., pcf	102.4	102.2	100.7	
Void Ratio	0.645	0.649	0.673	
Saturation %	27.8	35.8	52.7	
Diameter	2.42	2.42	2.42	
Height	1.00	1.00	1.00	
Sample Data: At Test				
Moisture %	18.8%	20.0%	20.3%	
Dry Dens., pcf	112.0	109.6	109.0	
Void Ratio	0.507	0.539	0.548	
Saturation %	100.0	100.0	100.0	
Diameter	2.42	2.42	2.42	
Height	0.915	0.932	0.924	
Normal Stress, psf	1000	2000	4000	
Shear Stress, psf	1534	2285	3600	
Strengths picked at Ult. Stress, psf	5.0%	5.0%	5.0%	
Strain Rate, %/min.	1.0	1.0	1.0	
CTL #	157-298			
Client:	Parikh Consultants, Inc.			
Project	California High-Speed Train Project			
Tested By:	MD			
Reduced By:	JC			
Date:	12/6/2011			

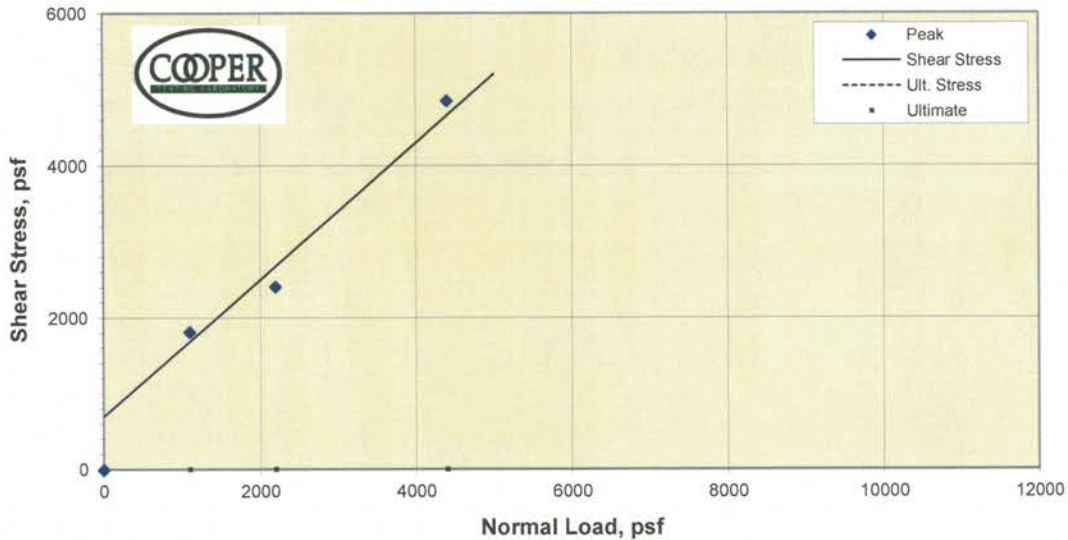
Specimen #	Boring	Sample	Depth, ft.	Visual Soil Classification
1	S0005A	14	66	Reddish Brown Silty SAND (slightly plastic)
2	S0005A	14	66	Reddish Brown Silty SAND (slightly plastic)
3	S0005A	14	66	Reddish Brown Silty SAND (slightly plastic)

Remarks: *DS-CU* A fully undrained condition may not be attained in this test.

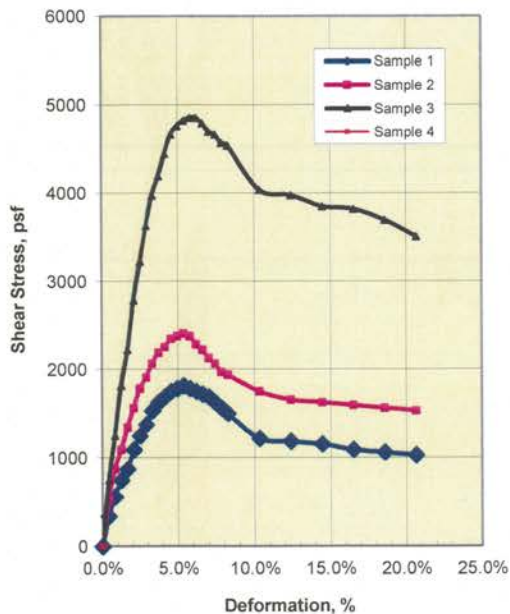
Plate No: B-6G

Direct Shear

(Consolidated-Undrained)



P. Phi (degrees)	42.0	Ult. Phi (degrees)	
P. Cohesion (psf)	700	Ult. Cohesion (psf)	



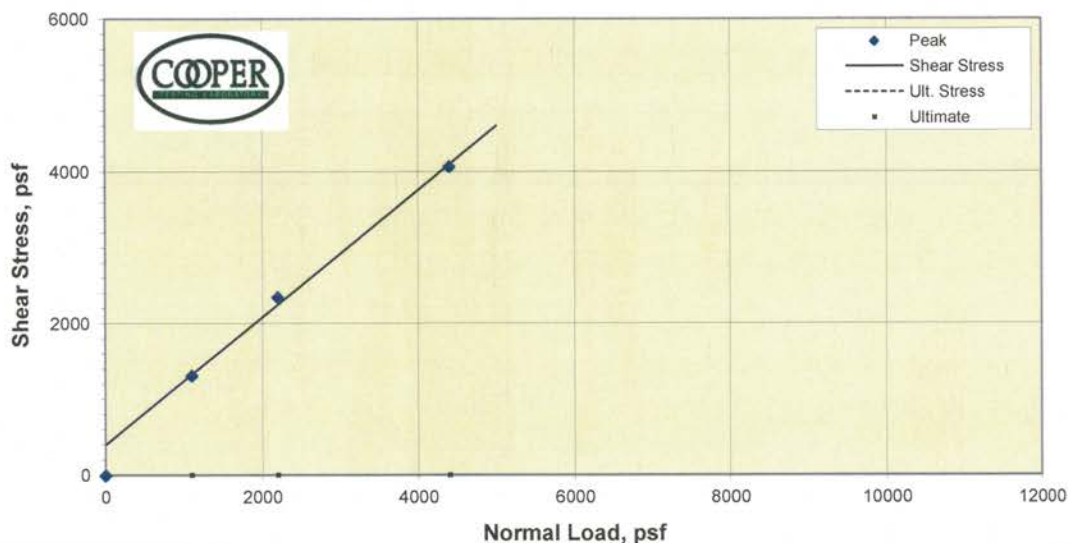
Sample Data: Initial			
	1	2	3
Moisture %	25.1%	22.7%	21.1%
Dry Dens., pcf	99.2	100.5	103.0
Void Ratio	0.698	0.678	0.636
Saturation %	97.0	90.6	89.7
Diameter	2.42	2.42	2.42
Height	1.00	1.00	1.00
Sample Data: At Test			
Moisture %	23.2%	22.9%	21.0%
Dry Dens., pcf	103.8	104.2	107.7
Void Ratio	0.626	0.619	0.566
Saturation %	100.0	100.0	100.0
Diameter	2.42	2.42	2.42
Height	0.957	0.964	0.957
Normal Stress, psf	1100	2200	4400
Shear Stress, psf	1816	2411	4853
Strengths picked at	Peak	Peak	Peak
Ult. Stress, psf			
Strain Rate, %/min.	1.0	1.0	1.0
CTL #	157-298		
Client:	Parikh Consultants, Inc.		
Project	California High-Speed Train Project		
Tested By:	MD		
Reduced By:	JC		
Date:	12/6/2011		

Specimen #	Boring	Sample	Depth, ft.	Visual Soil Classification
1	S0005A	22	106	Brown Silty SAND
2	S0005A	22	106	Brown Silty SAND
3	S0005A	22	106	Brown Silty SAND
Remarks:				
DS-CU A fully undrained condition may not be attained in this test.				

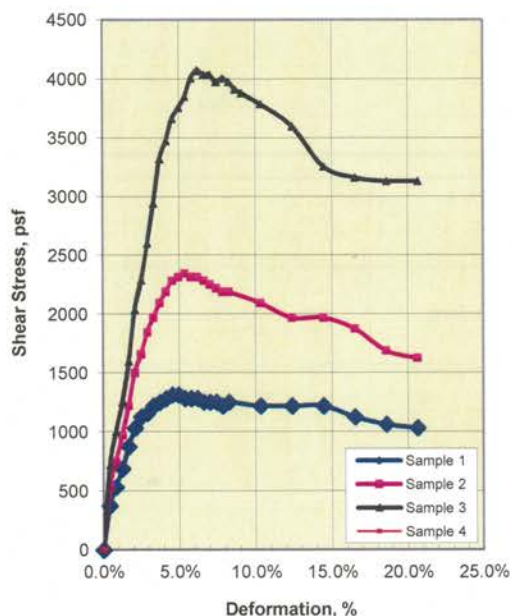
Plate No: B-6H

Direct Shear

(Consolidated-Undrained)



P. Phi (degrees)	40.0	Ult. Phi (degrees)	
P. Cohesion (psf)	400	Ult. Cohesion (psf)	



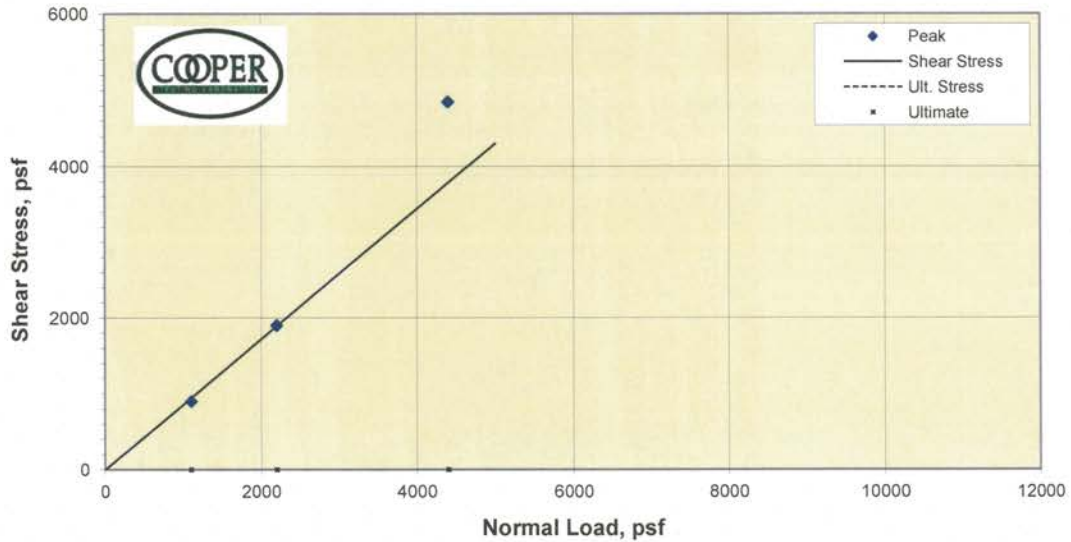
	Sample Data: Initial			
	1	2	3	4
Moisture %	2.6%	5.3%	3.2%	
Dry Dens., pcf	98.4	98.3	98.4	
Void Ratio	0.713	0.715	0.713	
Saturation %	9.8	20.1	12.1	
Diameter	2.42	2.42	2.42	
Height	1.00	1.00	1.00	
	Sample Data: At Test			
Moisture %	20.1%	21.4%	18.9%	
Dry Dens., pcf	109.3	106.9	111.6	
Void Ratio	0.543	0.578	0.511	
Saturation %	100.0	100.0	100.0	
Diameter	2.42	2.42	2.42	
Height	0.900	0.920	0.882	
Normal Stress, psf	1100	2200	4400	
Shear Stress, psf	1315	2348	4070	
Strengths picked at	Peak	Peak	Peak	
Ult. Stress, psf				
Strain Rate, %/min.	1.0	1.0	1.0	
CTL #	157-298			
Client:	Parikh Consultants, Inc.			
Project	California High-Speed Train Project			
Tested By:	MD			
Reduced By:	JC			
Date:	12/6/2011			

Specimen #	Boring:	Sample:	Depth, ft:	Visual Soil Classification
1	S0006A	4	16	Light Brown SAND
2	S0006A	4	16	Light Brown SAND
3	S0006A	4	16	Light Brown SAND
Remarks:				
DS-CU A fully undrained condition may not be attained in this test.				

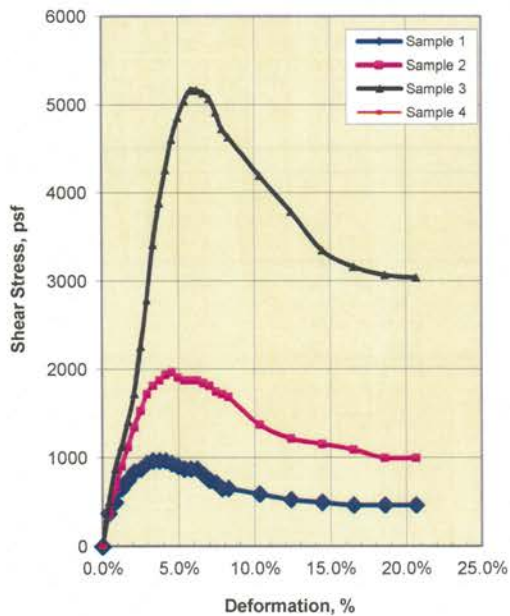
Plate No: B-6I

Direct Shear

(Consolidated-Undrained)



P. Phi (degrees)	40.7	Ult. Phi (degrees)	
P. Cohesion (psf)	0	Ult. Cohesion (psf)	



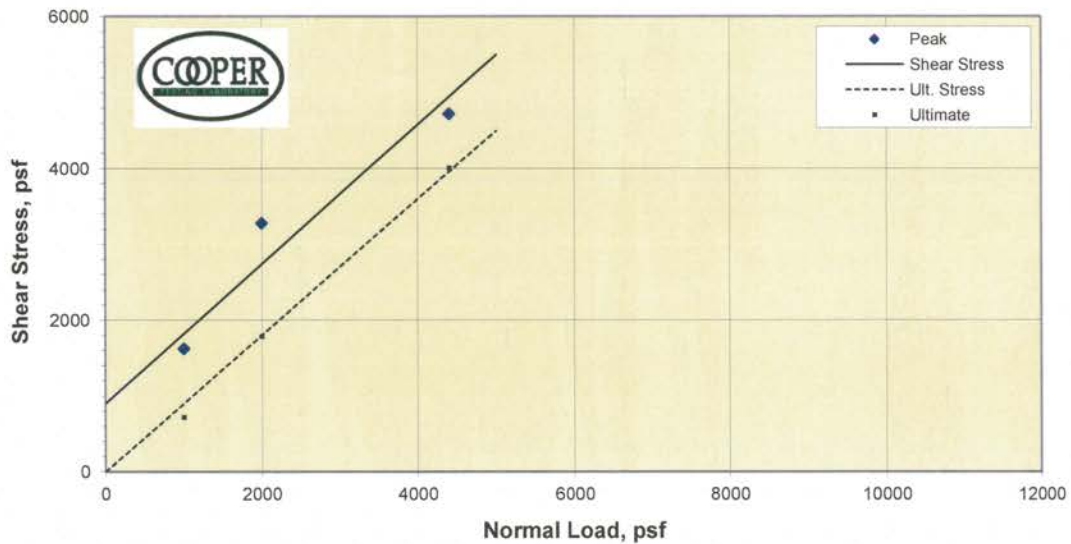
Sample Data: Initial			
	1	2	3
Moisture %	2.6%	2.7%	2.5%
Dry Dens., pcf	94.0	93.0	97.8
Void Ratio	0.794	0.812	0.724
Saturation %	8.9	8.9	9.4
Diameter	2.42	2.42	2.42
Height	1.00	1.00	1.00
Sample Data: At Test			
Moisture %	22.4%	23.5%	21.2%
Dry Dens., pcf	105.0	103.2	107.2
Void Ratio	0.606	0.635	0.573
Saturation %	100.0	100.0	100.0
Diameter	2.42	2.42	2.42
Height	0.894	0.901	0.912
Normal Stress, psf	1100	2200	4400
Shear Stress, psf	908	1910	4853
Strengths picked at Ult. Stress, psf	5.0%	5.0%	5.0%
Strain Rate, %/min.	1.0	1.0	1.0
CTL #	157-298		
Client:	Parikh Consultants, Inc.		
Project	California High-Speed Train Project		
Tested By:	MD		
Reduced By:	JC		
Date:	12/6/2011		

Specimen #	Boring	Sample	Depth, ft	Visual Soil Classification
1	S0007A	7	31	Light Brown SAND
2	S0007A	7	31	Light Brown SAND
3	S0007A	7	31	Light Brown SAND
Remarks:				
DS-CU A fully undrained condition may not be attained in this test.				

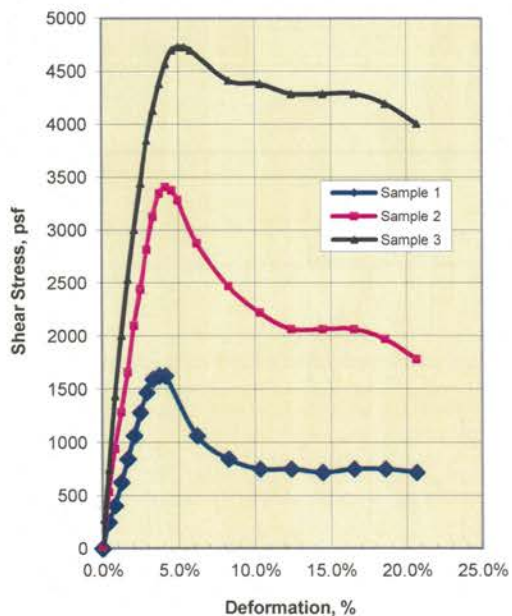
Plate No: B-6J

Direct Shear

(Consolidated-Undrained)



P. Phi (degrees)	42.6	Ult. Phi (degrees)	42.0
P. Cohesion (psf)	900	Ult. Cohesion (psf)	0



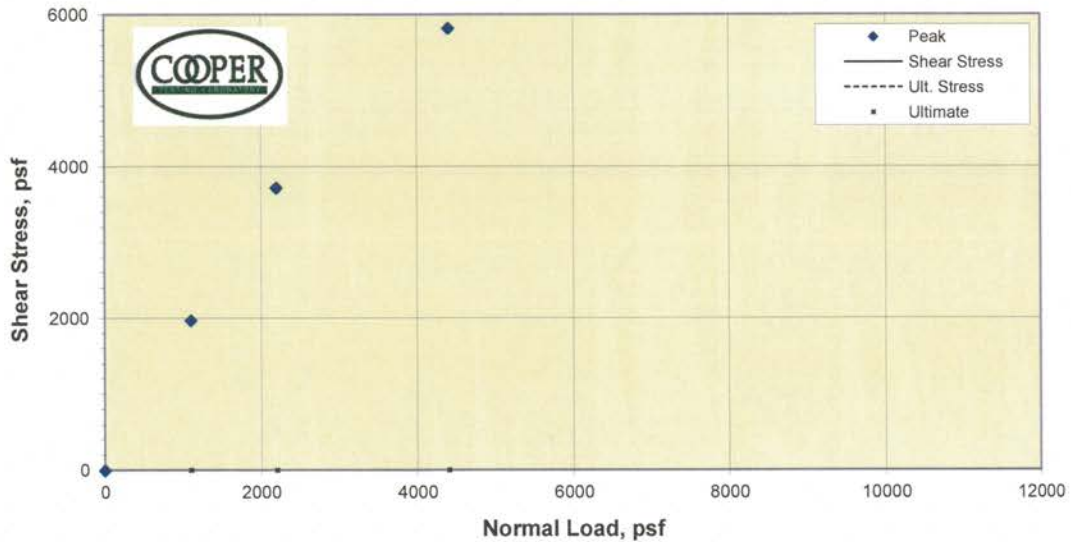
Sample Data: Initial			
	1	2	3
Moisture %	19.4%	22.8%	16.8%
Dry Dens., pcf	76.3	67.9	80.6
Void Ratio	1.209	1.482	1.090
Saturation %	43.3	41.5	41.6
Diameter	2.42	2.42	2.42
Height	0.99	1.00	0.99
Sample Data: At Test			
Moisture %	35.8%	42.3%	32.0%
Dry Dens., pcf	85.8	78.7	90.5
Void Ratio	0.965	1.142	0.863
Saturation %	100.0	100.0	100.0
Diameter	2.42	2.42	2.42
Height	0.880	0.863	0.882
Normal Stress, psf	1000	2000	4400
Shear Stress, psf	1628	3287	4727
Strengths picked at	5.0%	5.0%	5.0%
Ult. Stress, psf	720	1785	4007
Strain Rate, %/min.	1.0	1.0	1.0
CTL #	157-298		
Client:	Parikh Consultants, Inc.		
Project	California High-Speed Train Project		
Tested By:	MD		
Reduced By:	JC		
Date:	12/6/2011		

Specimen #	Boring	Sample	Depth, ft.	Visual Soil Classification
1	S0008A	S19	91	Light Brown Silty SAND
2	S0008A	S19	91	Light Brown Silty SAND
3	S0008A	S19	91	Light Brown Silty SAND
Remarks:				
DS-CU A fully undrained condition may not be attained in this test.				

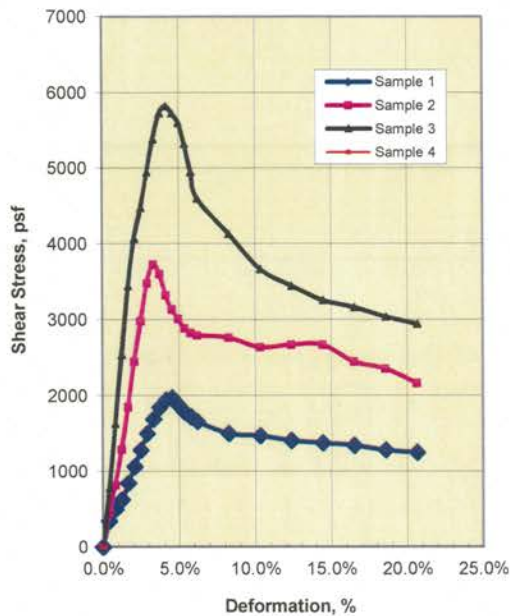
Plate No: B-6K

Direct Shear

(Consolidated-Undrained)



P. Phi (degrees)		Ult. Phi (degrees)	
P. Cohesion (psf)		Ult. Cohesion (psf)	



Sample Data: Initial				
	1	2	3	4
Moisture %	10.7%	11.8%	12.2%	
Dry Dens., pcf	112.4	114.4	115.7	
Void Ratio	0.499	0.473	0.457	
Saturation %	58.0	67.1	72.2	
Diameter	2.42	2.42	2.42	
Height	1.00	1.00	1.01	

Sample Data: At Test			
Moisture %	14.9%	14.4%	14.2%
Dry Dens., pcf	120.2	121.4	121.9
Void Ratio	0.403	0.390	0.384
Saturation %	100.0	100.0	100.0
Diameter	2.42	2.42	2.42
Height	0.935	0.943	0.958
Normal Stress, psf	1100	2200	4400
Shear Stress, psf	1972	3726	5823
Strengths picked at	Peak	Peak	Peak
Ult. Stress, psf			
Strain Rate, %/min.	1.0	1.0	1.0

CTL #	157-298
Client:	Parikh Consultants, Inc.
Project	California High-Speed Train Project
Tested By:	MD
Reduced By:	JC
Date:	12/6/2011

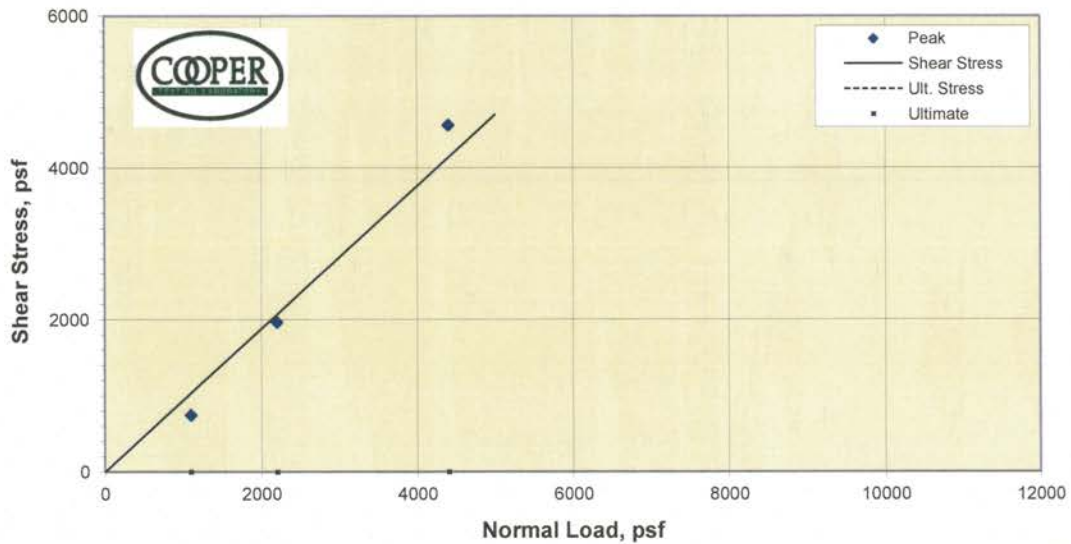
Specimen #	Boring:	Sample:	Depth, ft:	Visual Soil Classification
1	S0008A	S06	26	Olive Brown Silty SAND
2	S0008A	S06	26	Olive Brown Silty SAND
3	S0008A	S06	26	Olive Brown Silty SAND

Remarks: *DS-CU* A fully undrained condition may not be attained in this test.

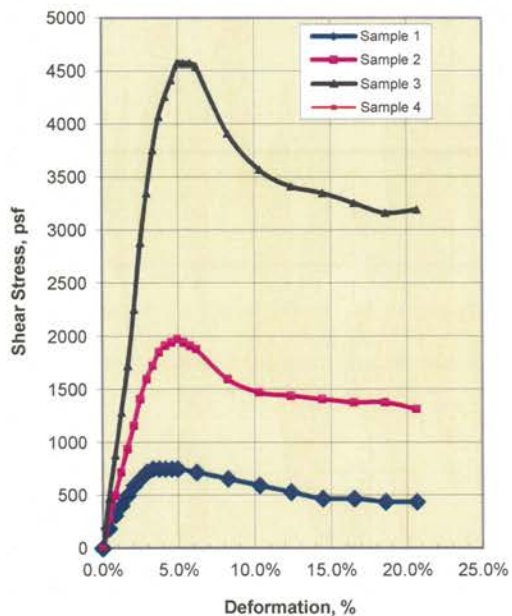
Plate No: B-6L

Direct Shear

(Consolidated-Undrained)



P. Phi (degrees)	43.2	Ult. Phi (degrees)	
P. Cohesion (psf)	0	Ult. Cohesion (psf)	



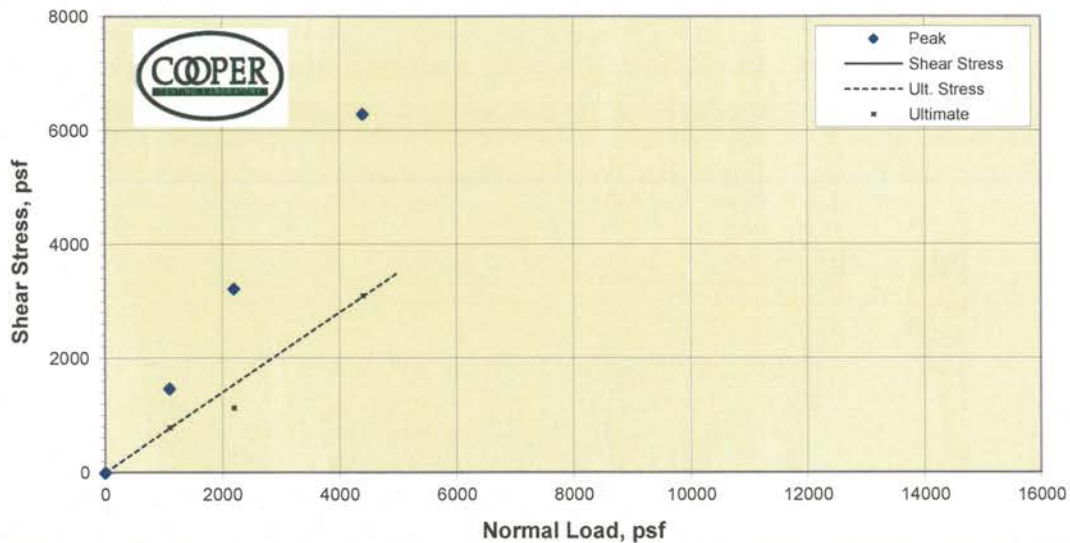
Sample Data: Initial				
	1	2	3	4
Moisture %	1.5%	2.3%	2.1%	
Dry Dens., pcf	96.8	95.8	100.9	
Void Ratio	0.742	0.759	0.671	
Saturation %	5.5	8.3	8.3	
Diameter	2.42	2.42	2.42	
Height	1.00	1.00	1.00	
Sample Data: At Test				
Moisture %	21.5%	20.8%	19.0%	
Dry Dens., pcf	106.6	108.0	111.5	
Void Ratio	0.582	0.563	0.513	
Saturation %	100.0	100.0	100.0	
Diameter	2.42	2.42	2.42	
Height	0.907	0.888	0.904	
Normal Stress, psf	1100	2200	4400	
Shear Stress, psf	751	1972	4571	
Strengths picked at Ult. Stress, psf	5.0%	5.0%	5.0%	
Strain Rate, %/min.	1.0	1.0	1.0	
CTL #	157-298			
Client:	Parikh Consultants, Inc.			
Project	California High-Speed Train Project			
Tested By:	MD			
Reduced By:	JC			
Date:	12/6/2011			

Specimen #	Boring:	Sample:	Depth, ft:	Visual Soil Classification
1	S0008A	S15	71	Light Brown SAND
2	S0008A	S15	71	Light Brown SAND
3	S0008A	S15	71	Light Brown SAND
Remarks:				
DS-CU A fully undrained condition may not be attained in this test.				

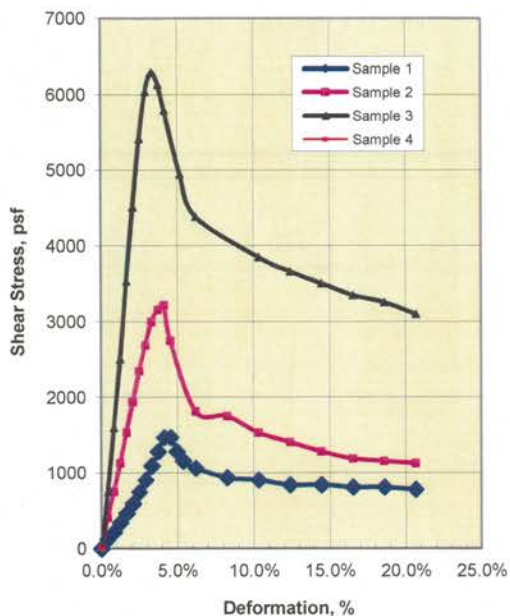
Plate No: B-6M

Direct Shear

(Consolidated-Undrained)



P. Phi (degrees)		Ult. Phi (degrees)	35.0
P. Cohesion (psf)		Ult. Cohesion (psf)	0



Sample Data: Initial				
	1	2	3	4
Moisture %	14.3%	14.8%	15.1%	
Dry Dens., pcf	105.7	106.0	107.7	
Void Ratio	0.595	0.590	0.564	
Saturation %	64.8	67.9	72.5	
Diameter	2.42	2.42	2.42	
Height	1.00	1.00	1.00	
Sample Data: At Test				
Moisture %	18.8%	18.0%	17.1%	
Dry Dens., pcf	112.0	113.6	115.5	
Void Ratio	0.506	0.485	0.461	
Saturation %	100.0	100.0	100.0	
Diameter	2.42	2.42	2.42	
Height	0.944	0.933	0.933	
Normal Stress, psf	1100	2200	4400	
Shear Stress, psf	1471	3225	6293	
Strengths picked at	Peak	Peak	Peak	
Ult. Stress, psf	783	1127	3099	
Strain Rate, %/min.	1.0	1.0	1.0	
CTL #	157-298			
Client:	Parikh Consultants, Inc.			
Project	California High-Speed Train Project			
Tested By:	MD			
Reduced By:	JC			
Date:	12/6/2011			

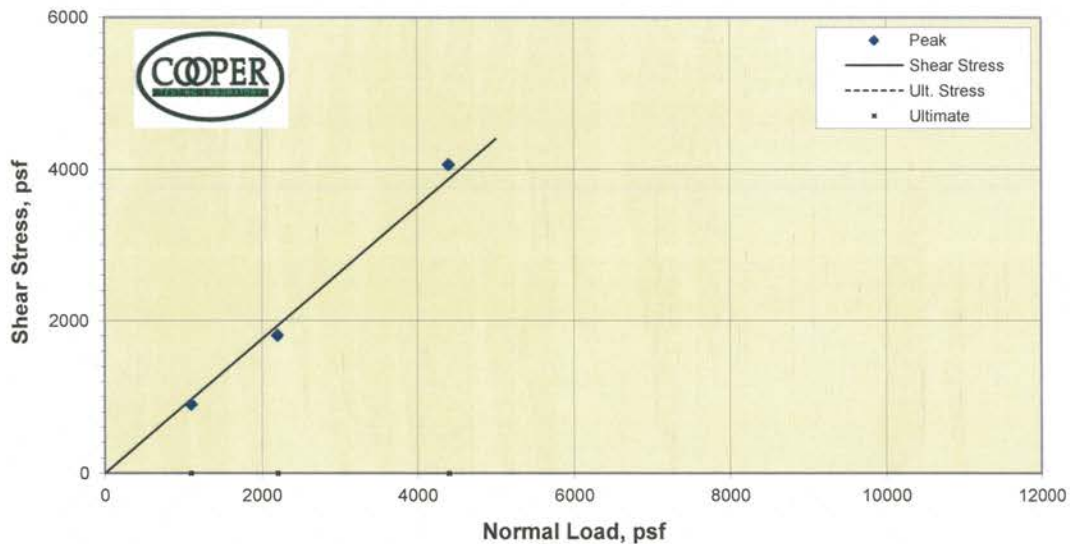
Specimen #	Boring	Sample	Depth, ft.	Visual Soil Classification
1	S0009R	16	76	Olive Brown Silty SAND
2	S0009R	16	76	Olive Brown Silty SAND
3	S0009R	16	76	Olive Brown Silty SAND

Remarks: The peak friction angle exceeded 45 degrees, possibly due to the angularity of the sand.
 DS-CU A fully undrained condition may not be attained in this test.

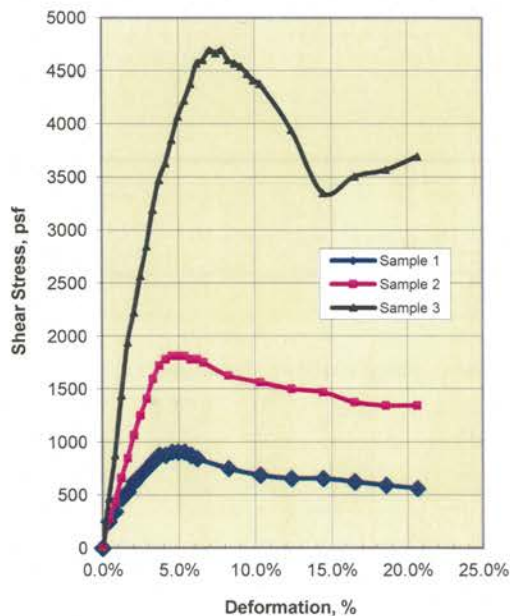
Plate No: B-6N

Direct Shear

(Consolidated-Undrained)



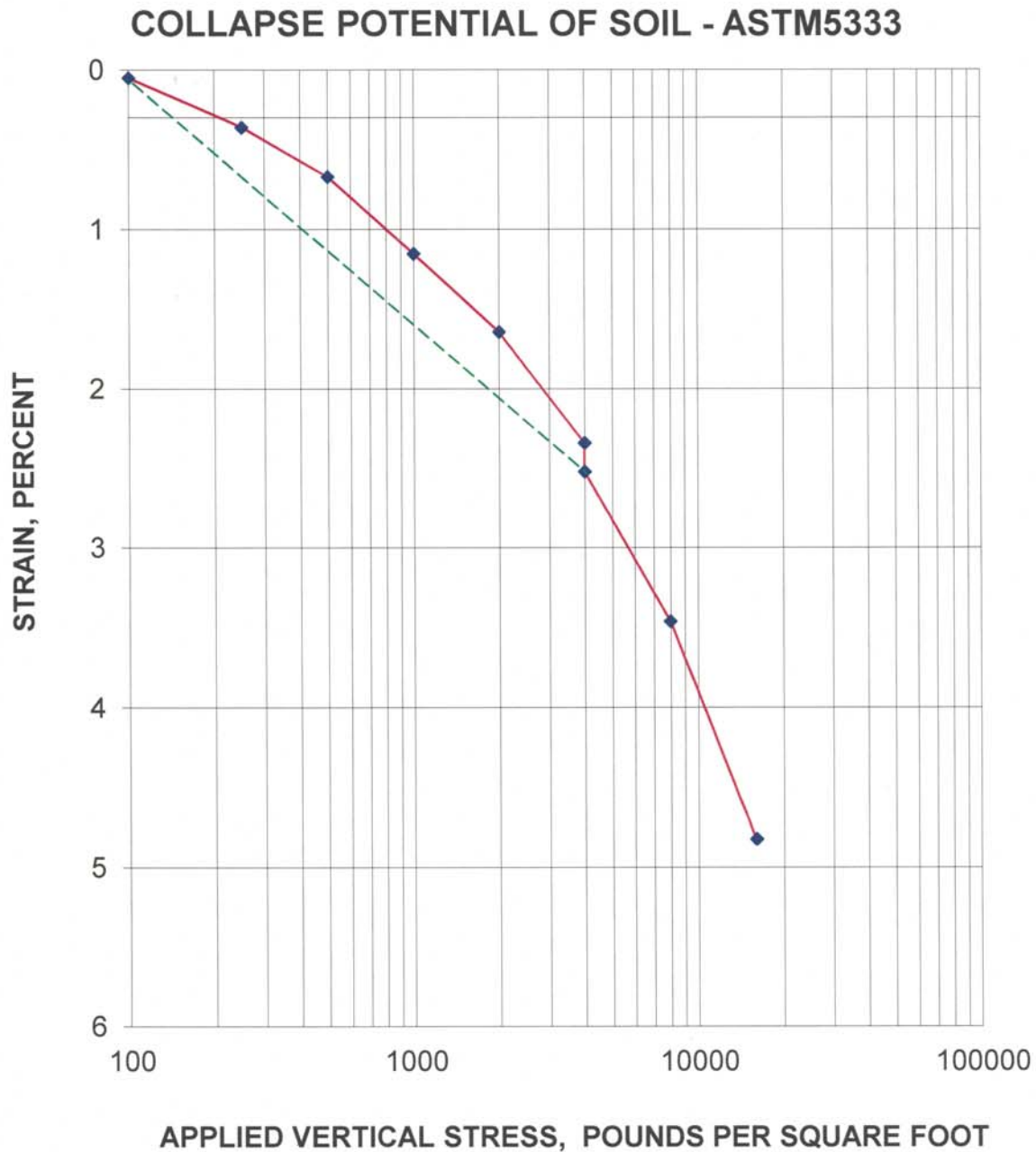
P. Phi (degrees)	41.3	Ult. Phi (degrees)	
P. Cohesion (psf)	0	Ult. Cohesion (psf)	



Sample Data: Initial				
	1	2	3	4
Moisture %	3.3%	2.3%	3.1%	
Dry Dens., pcf	95.4	97.0	100.4	
Void Ratio	0.766	0.738	0.679	
Saturation %	11.5	8.5	12.4	
Diameter	2.42	2.42	2.42	
Height	1.00	1.00	1.00	
Sample Data: At Test				
Moisture %	20.3%	18.7%	16.1%	
Dry Dens., pcf	109.0	112.1	117.7	
Void Ratio	0.548	0.505	0.434	
Saturation %	100.0	100.0	100.0	
Diameter	2.42	2.42	2.42	
Height	0.876	0.865	0.853	
Normal Stress, psf	1100	2200	4400	
Shear Stress, psf	908	1816	4070	
Strengths picked at	5.0%	5.0%	5.0%	
Ult. Stress, psf				
Strain Rate, %/min.	1.0	1.0	1.0	
CTL #	157-298			
Client:	Parikh Consultants, Inc.			
Project	California High-Speed Train Project			
Tested By:	MD			
Reduced By:	JC			
Date:	12/6/2011			

Specimen #	Boring	Sample	Depth, ft:	Visual Soil Classification
1	S00010	4	16	Light Brown SAND
2	S00010	4	16	Light Brown SAND
3	S00010	4	16	Light Brown SAND
Remarks:				
DS-CU A fully undrained condition may not be attained in this test.				

Plate No: B-60



	MOISTURE CONTENT %	DRY DENSITY PCF	HEIGHT (INCHES)	DIAMETER (INCHES)
INITIAL	14.0	107.5	1.0000	2.416
FINAL	18.1	112.9	0.9518	2.416

BORING NO.	S0001A	SAMPLE NO.	S15	ELEV. OR DEPTH	71'
DESCRIPTION	Silty fine Sand, brown (Undisturbed)				



PARIKH CONSULTANTS, INC.
 GEOTECHNICAL CONSULTANTS
 MATERIALS ENGINEERING

MINIMUM ARRA - FUNDED SEGMENT - CHST
 AECOM

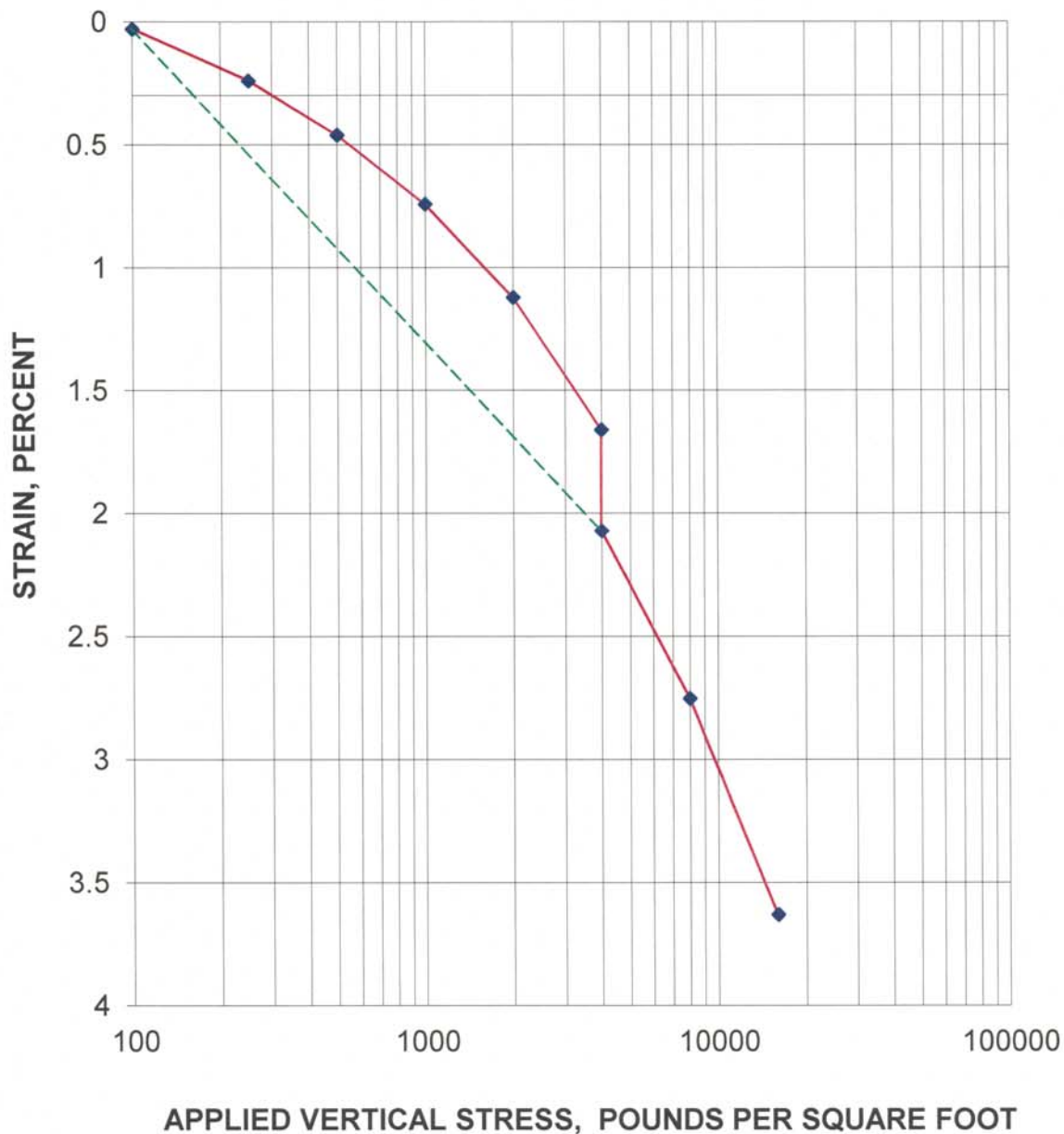
DATE
 12/2/2011

JOB NO:
 2009-138-400

Reported by: Prav Dayah

PLATE NO: B-7A

COLLAPSE POTENTIAL OF SOIL - ASTM5333



	MOISTURE CONTENT %	DRY DENSITY PCF	HEIGHT (INCHES)	DIAMETER (INCHES)
INITIAL	4.8	125.3	1.0000	2.416
FINAL	10.2	130.0	0.9637	2.416

BORING NO.	S0010A	SAMPLE NO.	S01	ELEV. OR DEPTH	3'
DESCRIPTION	Silty fine Sand, brown (Undisturbed)				



PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS ENGINEERING

MINIMUM ARRA - FUNDED SEGMENT - CHST
AECOM

DATE
12/8/2011

JOB NO:
2009-138-400

Reported by: Prav Dayah

PLATE NO: B-7B



LABORATORY TEST REPORT

(408)-452-9000

Parikh Consultants, Inc.

PROJECT NAME: MINIMUM ARRA - FUNDED SEGMENT - CHST

PROJECT #: 2009-138-400

SAMPLE #: S0002A

DEPTH: 2'-5'

LAB #: M837

SOURCE: Fresno / Native

DATE: 12/2/2011

MATERIAL DESCRIPTION Silty Fine Sand, brown

EXPANSION INDEX - ASTM D-4829

Expansion Index	0	Specification
Corrected Expansion Index	0	
Expansion Potential	Very Low	
Saturation %	Initial: 52	Final: 74
Moisture Content%	Initial: 7.1	Final: 10.0
Dry Density, pcf	Initial: 123.0	Final: 123.0

SAND EQUIVALENT CTM 217

SE	Specifications
----	----------------

Sieve Analysis CTM 202

Sieve Size	Percent Passing	Project Specification
6"		
3"		
1-1/2"		
1"		
3/4"		
3/8"		
No. 4		
No. 30		
No. 50		
No. 100		
No. 200		

Comments:

Reported by : Prav Dayah

PLATE NO: B-8A

PARIKH CONSULTANT'S INC.



LABORATORY TEST REPORT

(408)-452-9000

Parikh Consultants, Inc.

PROJECT NAME: MINIMUM ARRA - FUNDED SEGMENT - CHST

PROJECT #: 2009-138-400

SAMPLE #: S0008A

DEPTH: 2'-5'

LAB #: M837

SOURCE: Fresno / Native

DATE: 12/2/2011

MATERIAL DESCRIPTION Silty Fine Sand, brown

EXPANSION INDEX - ASTM D-4829

Expansion Index	0	Specification
Corrected Expansion Index	0	
Expansion Potential	Very Low	
Saturation %	Initial: 51	Final: 82
Moisture Content%	Initial: 7.1	Final: 11.5
Dry Density, pcf	Initial: 122.2	Final: 122.2

SAND EQUIVALENT CTM 217

SE	Specifications
----	----------------

Sieve Analysis CTM 202

Sieve Size	Percent Passing	Project Specification
6"		
3"		
1-1/2"		
1"		
3/4"		
3/8"		
No. 4		
No. 30		
No. 50		
No. 100		
No. 200		

Comments:

Reported by : Prav Dayah

PLATE NO: B-8B

PARIKH CONSULTANT'S INC.

6/14/2005

06/29/2012 ADDENDUM 3 - RFP HSR 11-16



R-VALUE REPORT

Parikh Consultants, Inc.

ASTM D2844 or CTM 301

(408) 452-9000

Project Name: MINIMUM ARRA - FUNDED SEGMENT - CHST

Date: 11/27/11

Client: AECOM

Project #: 2009-138-400

Sample #: S0001A Depth: 2'-5'

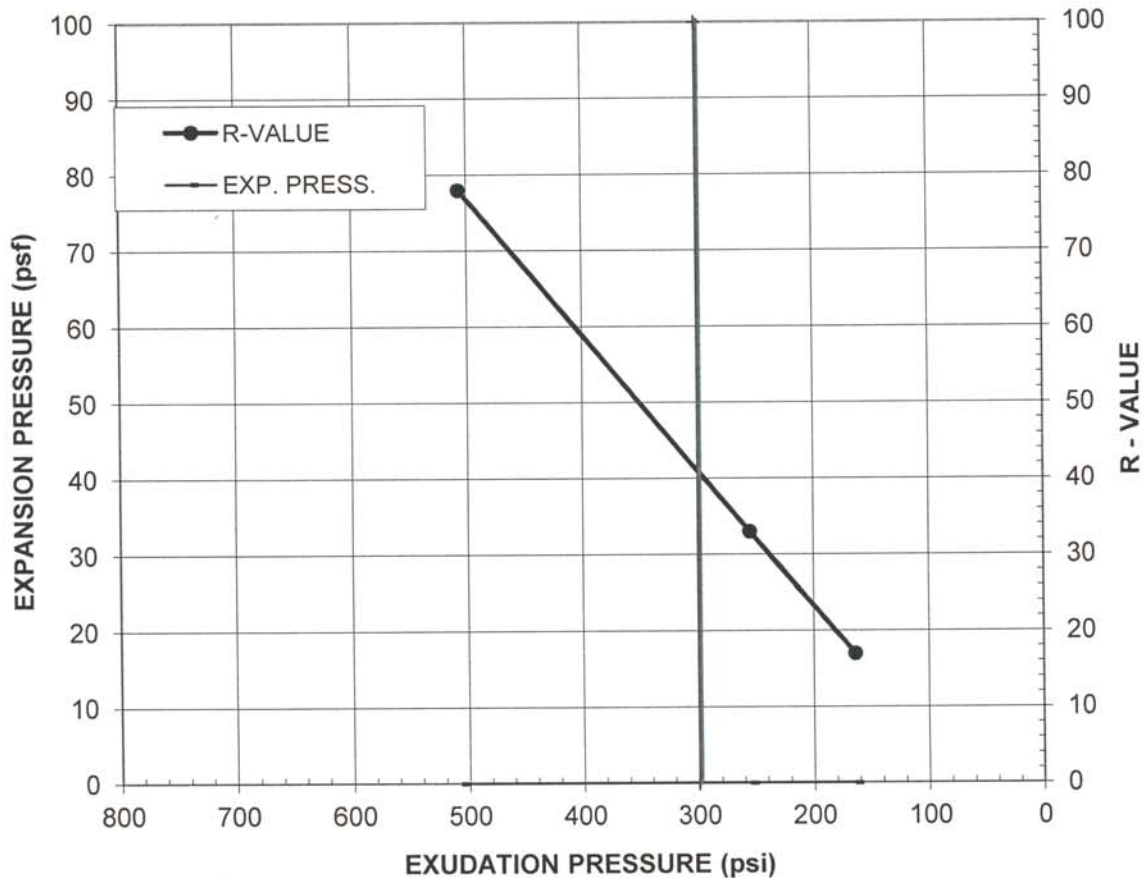
Lab #: M837

Location / Source: Fresno / Native

Sample Date:

Material : Silty Fine Sand, brown

Sampled By:



Specimen No.	A	B	C
Exudation Pressure, psi	164	255	507
Expansion Pressure, psf	0	0	0
R-Value	17	33	78
Moisture Content at Test, %	9.8	9.0	7.3
Dry Density at Test, pcf	126.4	128.4	130.6
R-Value @ 300 psi Exudation Pressure =	40	Expansion Pressure @300 psi Exudation, psf =	0
Minimum R-Value Requirement:			
Comments:			
Report By: Prav Dayah	PLATE NO: B-9A		

RVALUE with calcs pdp

06/29/2012 ADDENDUM 3 - RFP HSR 11-16



R-VALUE REPORT

Parikh Consultants, Inc.

ASTM D2844 or CTM 301

(408) 452-9000

Project Name: MINIMUM ARRA - FUNDED SEGMENT - CHST

Date: 11/27/11

Client: AECOM

Project #: 2009-138-400

Sample #: S0005R

Depth: 2'-5'

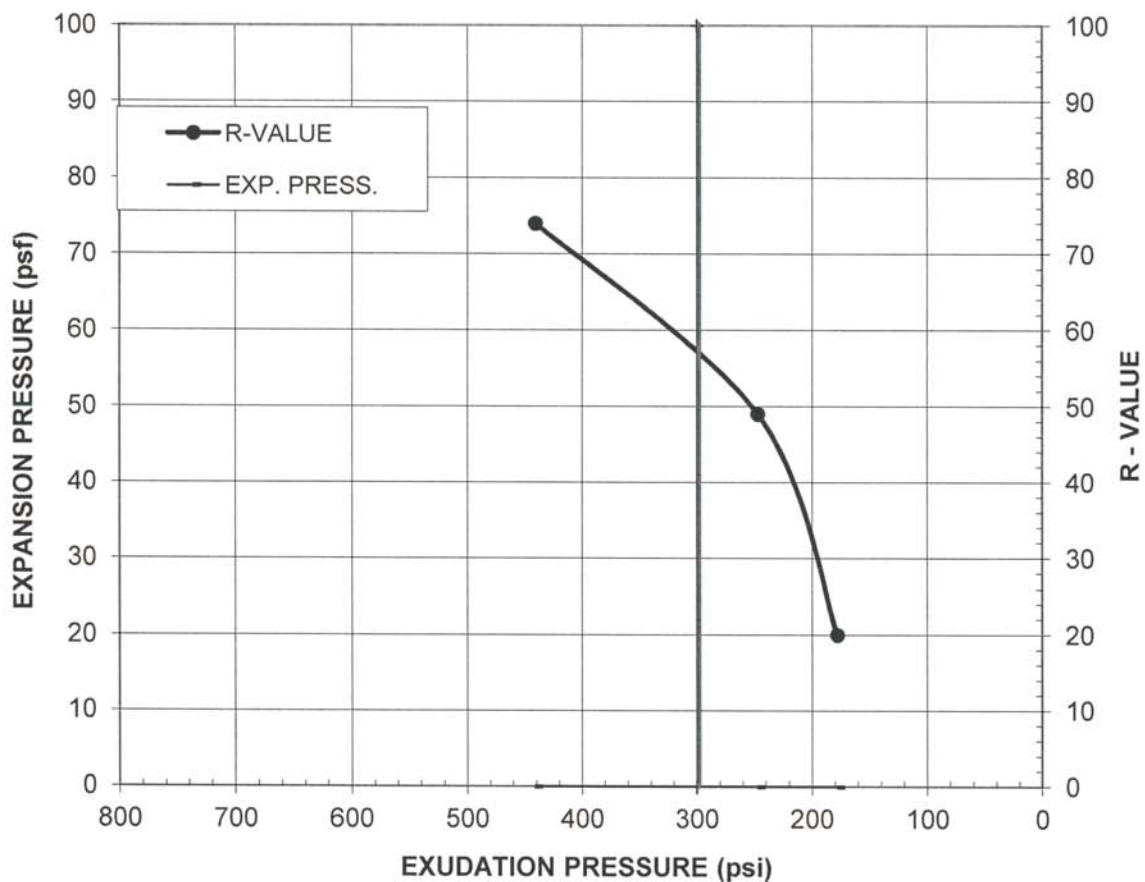
Lab #: M837

Location / Source: Fresno / Native

Sample Date:

Material: Silty Fine Sand, brown

Sampled By:



Specimen No.	A	B	C	
Exudation Pressure, psi	178	247	441	
Expansion Pressure, psf	0	0	0	
R-Value	20	49	74	
Moisture Content at Test, %	11.3	10.4	9.5	
Dry Density at Test, pcf	121.2	123.0	124.5	
R-Value @ 300 psi Exudation Pressure =	57	Expansion Pressure @300 psi Exudation, psf =	0	
Minimum R-Value Requirement:				
Comments:				
Report By: Prav Dayah				PLATE NO: B-9B

RVALUE with calcs pdp

06/29/2012 ADDENDUM 3 - RFP HSR 11-16



R-VALUE REPORT

Parikh Consultants, Inc.

ASTM D2844 or CTM 301

(408) 452-9000

Project Name: MINIMUM ARRA - FUNDED SEGMENT - CHST

Date: 11/27/11

Client: AECOM

Project #: 2009-138-400

Sample #: S0006A Depth: 2'-5'

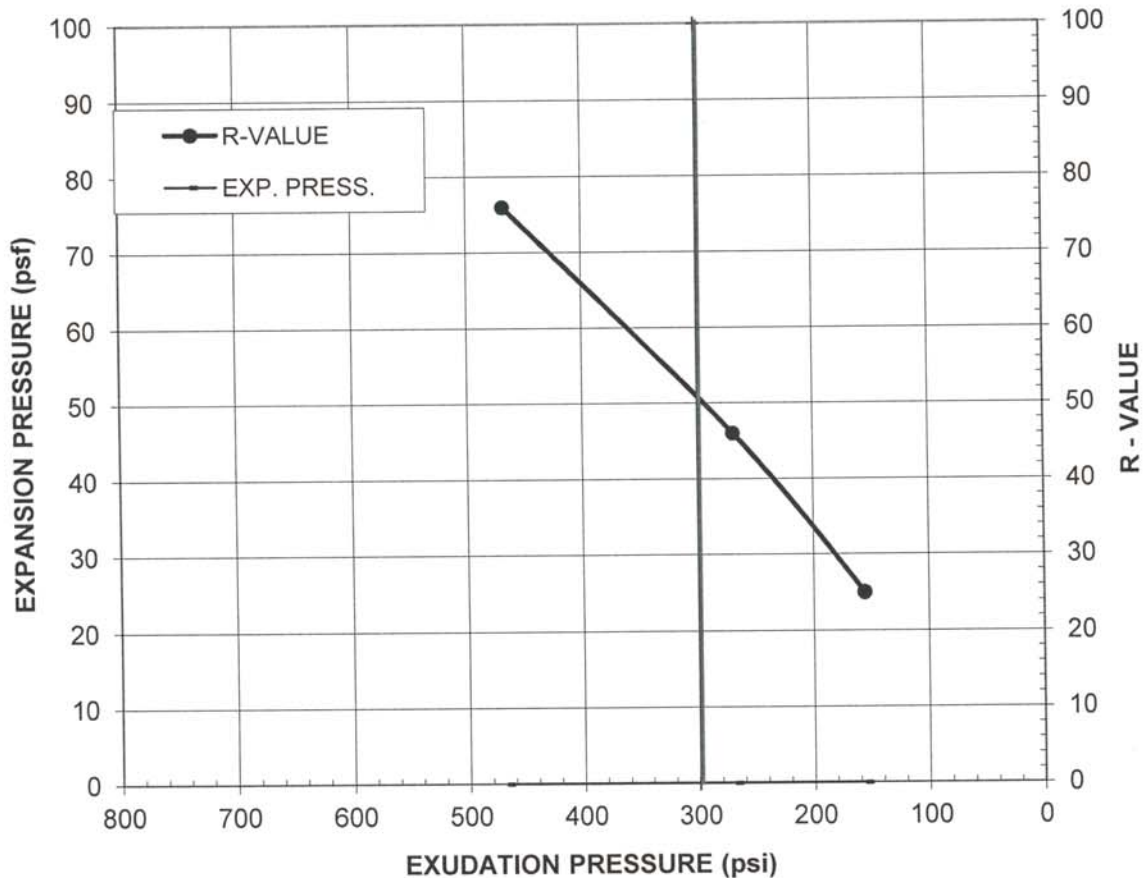
Lab #: M837

Location / Source: Fresno / Native

Sample Date:

Material: Silty Fine Sand, brown

Sampled By:



Specimen No.	A	B	C
Exudation Pressure, psi	156	269	468
Expansion Pressure, psf	0	0	0
R-Value	25	46	76
Moisture Content at Test, %	10.0	8.7	7.8
Dry Density at Test, pcf	124.6	127.4	128.6
R-Value @ 300 psi Exudation Pressure =	50	Expansion Pressure @300 psi Exudation, psf =	0
Minimum R-Value Requirement:			
Comments:			
Report By: Prav Dayah	PLATE NO: B-9C		



R-VALUE REPORT

Parikh Consultants, Inc.

ASTM D2844 or CTM 301

(408) 452-9000

Project Name: MINIMUM ARRA - FUNDED SEGMENT - CHST

Date: 11/27/11

Client: AECOM

Project #: 2009-138-400

Sample #: S0008A

Depth: 2'-5'

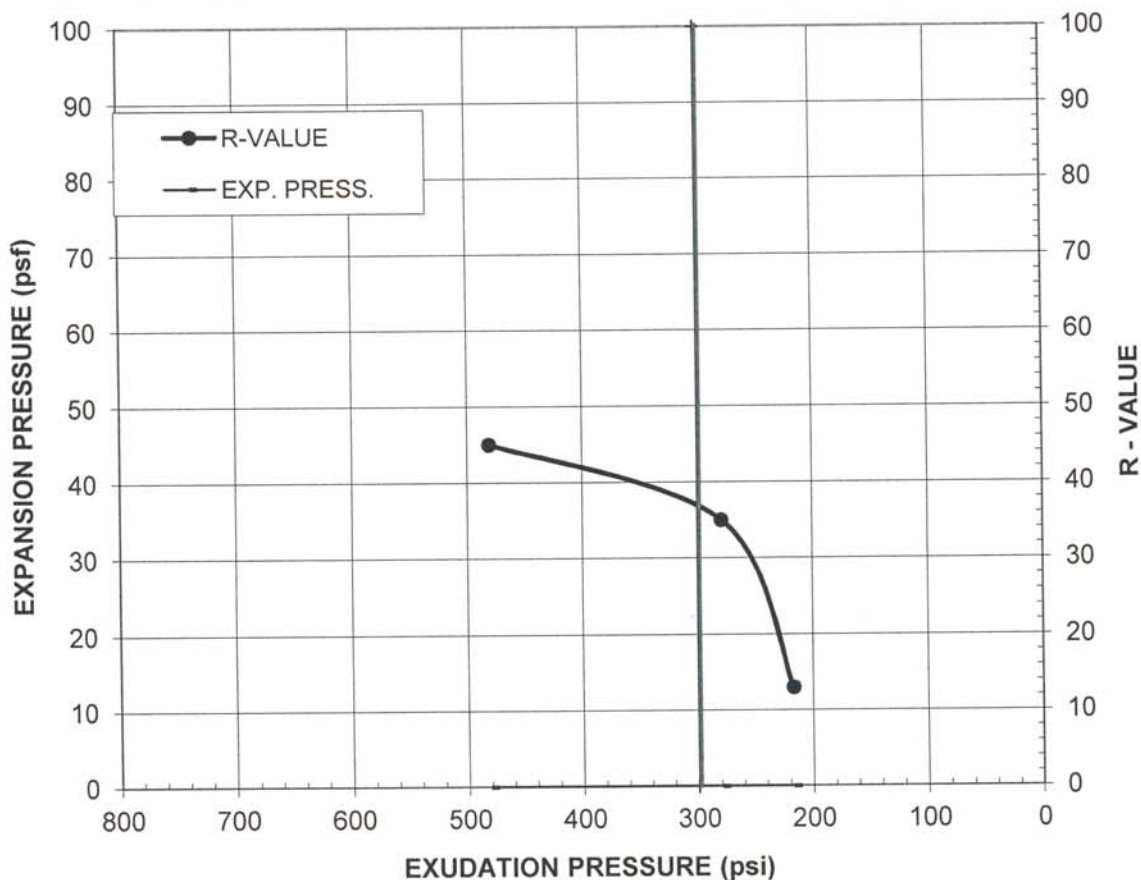
Lab #: M837

Location / Source: Fresno / Native

Sample Date:

Material: Silty Fine Sand, brown

Sampled By:



Specimen No.	A	B	C	
Exudation Pressure, psi	217	279	481	
Expansion Pressure, psf	0	0	0	
R-Value	13	35	45	
Moisture Content at Test, %	10.5	9.6	8.8	
Dry Density at Test, pcf	122.9	123.3	129.3	
R-Value @ 300 psi Exudation Pressure =	37	Expansion Pressure @300 psi Exudation, psf =	0	
Minimum R-Value Requirement:				
Comments:				
Report By: Prav Dayah				PLATE NO: B-9D

RVALUE with calcs pdp

06/29/2012 ADDENDUM 3 - RFP HSR 11-16



R-VALUE REPORT

Parikh Consultants, Inc.

ASTM D2844 or CTM 301

(408) 452-9000

Project Name: MINIMUM ARRA - FUNDED SEGMENT - CHST

Date: 11/27/11

Client: AECOM

Project #: 2009-138-400

Sample #: S0009R

Depth: 2'-5'

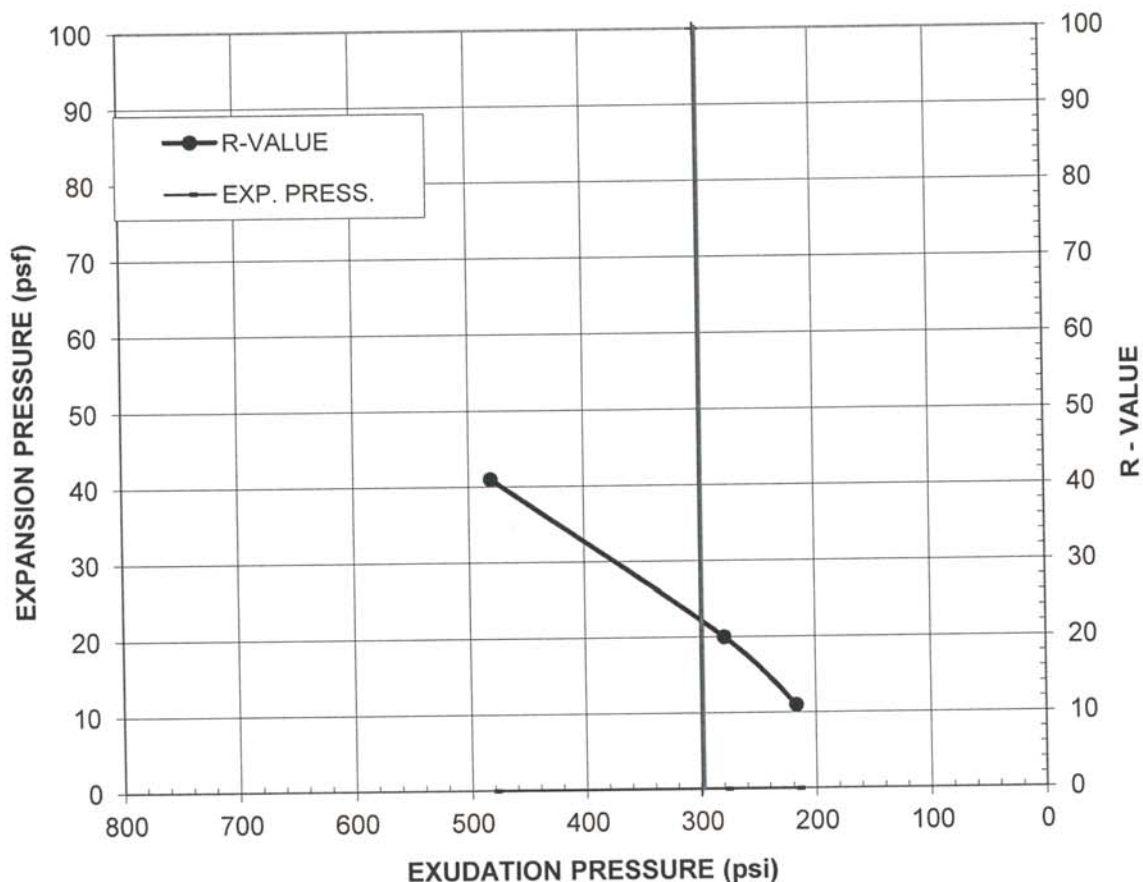
Lab #: M837

Location / Source: Fresno / Native

Sample Date:

Material: Silty Fine Sand, brown

Sampled By:



Specimen No.	150	261	432	
Exudation Pressure, psi	217	279	481	
Expansion Pressure, psf	0	0	0	
R-Value	11	20	41	
Moisture Content at Test, %	8.3	7.4	6.6	
Dry Density at Test, pcf	128.3	130.9	133.3	
R-Value @ 300 psi Exudation Pressure =	22	Expansion Pressure @300 psi Exudation, psf =	0	
Minimum R-Value Requirement:				
Comments:				
Report By: Prav Dayah				PLATE NO: B-9E

RVALUE with calcs pdp

06/29/2012 ADDENDUM 3 - RFP HSR 11-16



R-VALUE REPORT

Parikh Consultants, Inc.

ASTM D2844 or CTM 301

(408) 452-9000

Project Name: MINIMUM ARRA - FUNDED SEGMENT - CHST

Date: 11/27/11

Client: AECOM

Project #: 2009-138-400

Sample #: S0010A Depth: 2'-5'

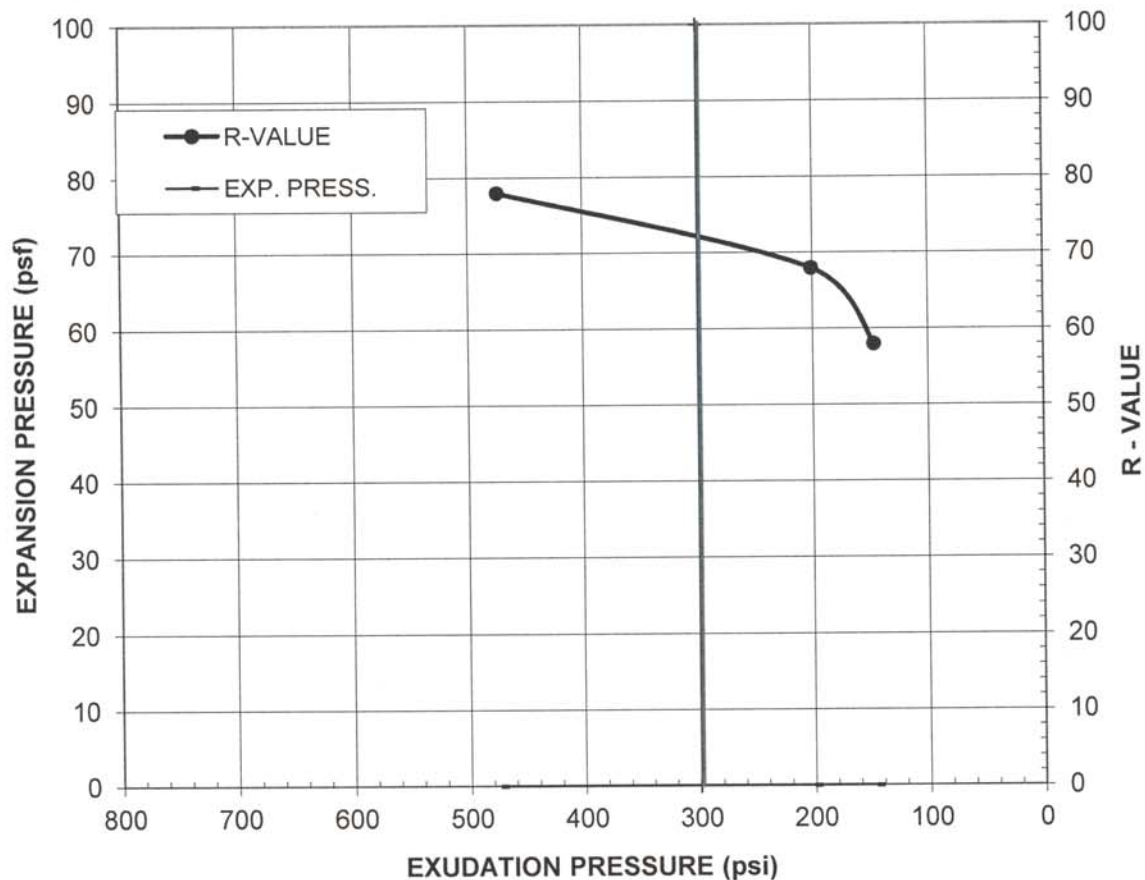
Lab #: M837

Location / Source: Fresno / Native

Sample Date:

Material : Silty Fine Sand, brown

Sampled By:



Specimen No.	150	261	432
Exudation Pressure, psi	147	201	474
Expansion Pressure, psf	0	0	0
R-Value	58	68	78
Moisture Content at Test, %	11.6	11.2	10.7
Dry Density at Test, pcf	123.3	124.6	124.9
R-Value @ 300 psi Exudation Pressure =	72	Expansion Pressure @300 psi Exudation, psf =	0
Minimum R-Value Requirement:			
Comments:			
Report By: Prav Dayah	PLATE NO: B-9F		

RVALUE with calcs pdp

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

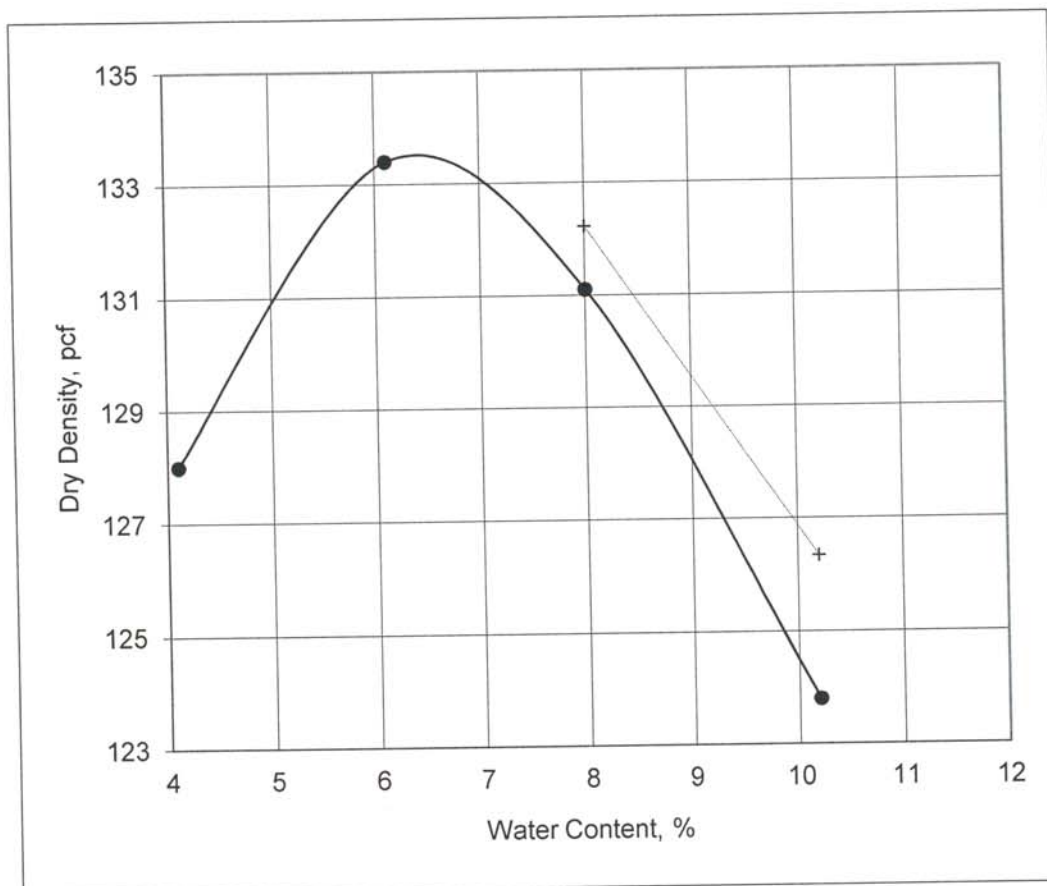


LABORATORY COMPACTION REPORT

(408)-452-9000

Parikh Consultants Inc.

Project:	MINIMUM ARRA - FUNDED SEGMENT - CHST			Date:	11/23/11
Client:	AECOM			Project #:	210126.10
Sample #:	S0001A	Depth:	2'-5'	Lab #:	M837
Location/Source:	Fresno / Native			Sample Date:	
Material:	Silty Fine Sand, brown			Sampled By:	



ASTM Test Designation: ☐ D 698 ☒ D 1557 Method: ☒ A ☐ B ☐ C

100 % Saturation Curve-Estimated Specific Gravity:

2.55

Laboratory Test Results

Trial #	1	2	3	4
Water Content, %	4.1	6.1	8.0	10.2
Dry Density, pcf	128.0	133.4	131.1	123.8

MAXIMUM DRY DENSITY, pcf: 133.3 OPTIMUM MOISTURE, %: 6.5

Comments:

Report By: Prav D Dayah

PLATE NO: B-10A

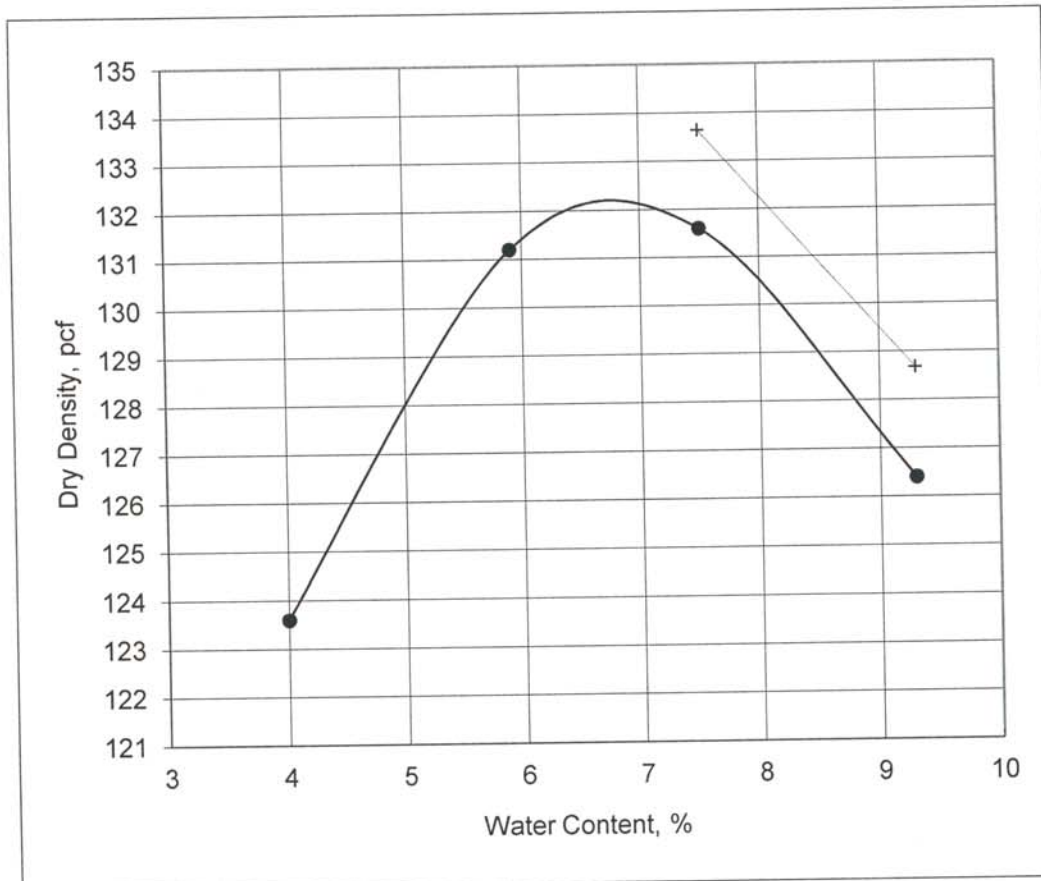


LABORATORY COMPACTION REPORT

(408)-452-9000

Parikh Consultants Inc.

Project:	MINIMUM ARRA - FUNDED SEGMENT - CHST	Date:	11/23/2011		
Client:	AECOM	Project #:	210126.10		
Sample #:	S0002A	Depth:	2'-5'	Lab #:	M837
Location/Source:	Fresno / Native	Sample Date:			
Material:	Silty Fine Sand, brown	Sampled By:			



ASTM Test Designation: ☐ D 698 ☒ D 1557 Method: ☒ A ☐ B ☐ C

100 % Saturation Curve-Estimated Specific Gravity:

Laboratory Test Results

Trial #	1	2	3	4
Water Content, %	4.0	5.9	7.5	9.3
Dry Density, pcf	123.6	131.2	131.6	126.4

MAXIMUM DRY DENSITY, pcf: **132.2** OPTIMUM MOISTURE, %: **6.8**

Comments:

Report By: Prav D Dayah

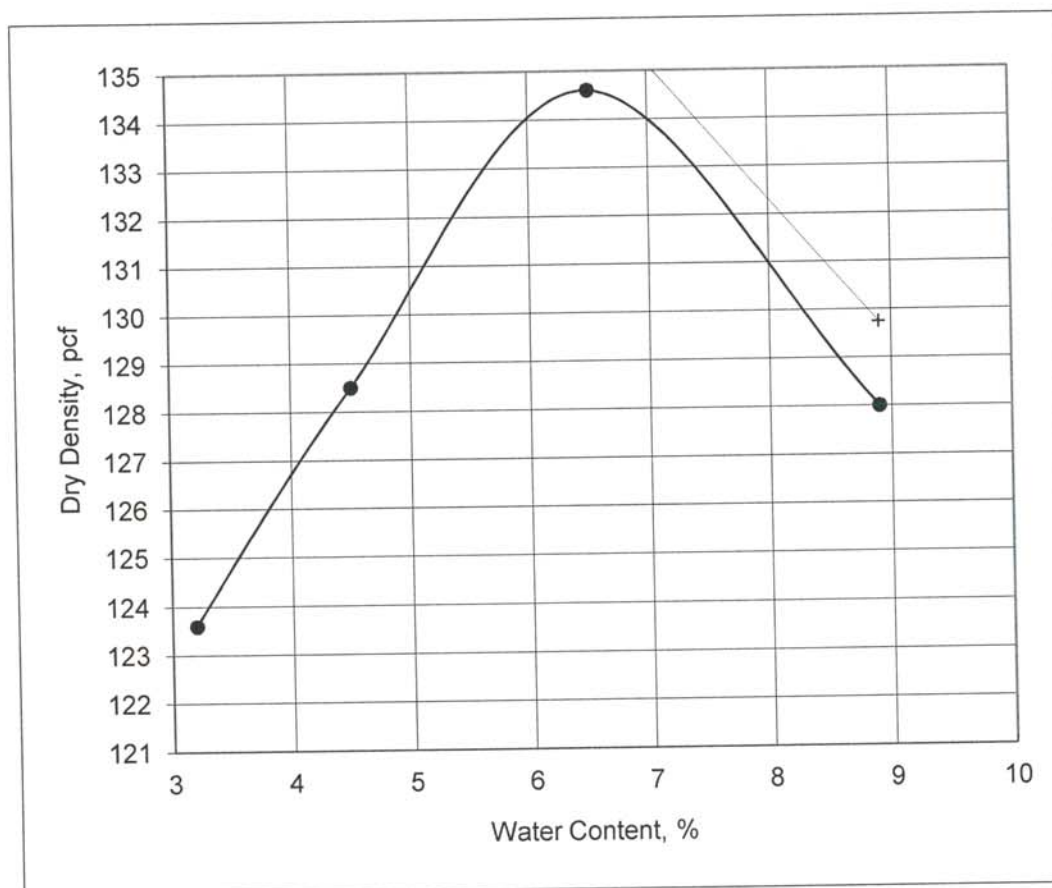
PLATE NO: B-10B



LABORATORY COMPACTION REPORT

(408)-452-9000
Parikh Consultants Inc.

Project:	MINIMUM ARRA - FUNDED SEGMENT - CHST	Date:	11/23/2011		
Client:	AECOM	Project #:	210126.10		
Sample #:	S0003A	Depth:	2'-5'	Lab #:	M837
Location/Source:	Fresno / Native	Sample Date:			
Material:	Silty Fine Sand, brown	Sampled By:			



ASTM Test Designation: ☐ D 698 ☒ D 1557 Method: ☒ A ☐ B ☐ C

100 % Saturation Curve-Estimated Specific Gravity: 2.55

Laboratory Test Results

Trial #	1	2	3	4
Water Content, %	3.2	4.5	6.5	8.9
Dry Density, pcf	123.6	128.5	134.6	128.0

MAXIMUM DRY DENSITY, pcf:	134.5	OPTIMUM MOISTURE, %:	6.5
---------------------------	-------	----------------------	-----

Comments:

Report By: Prav D Dayah

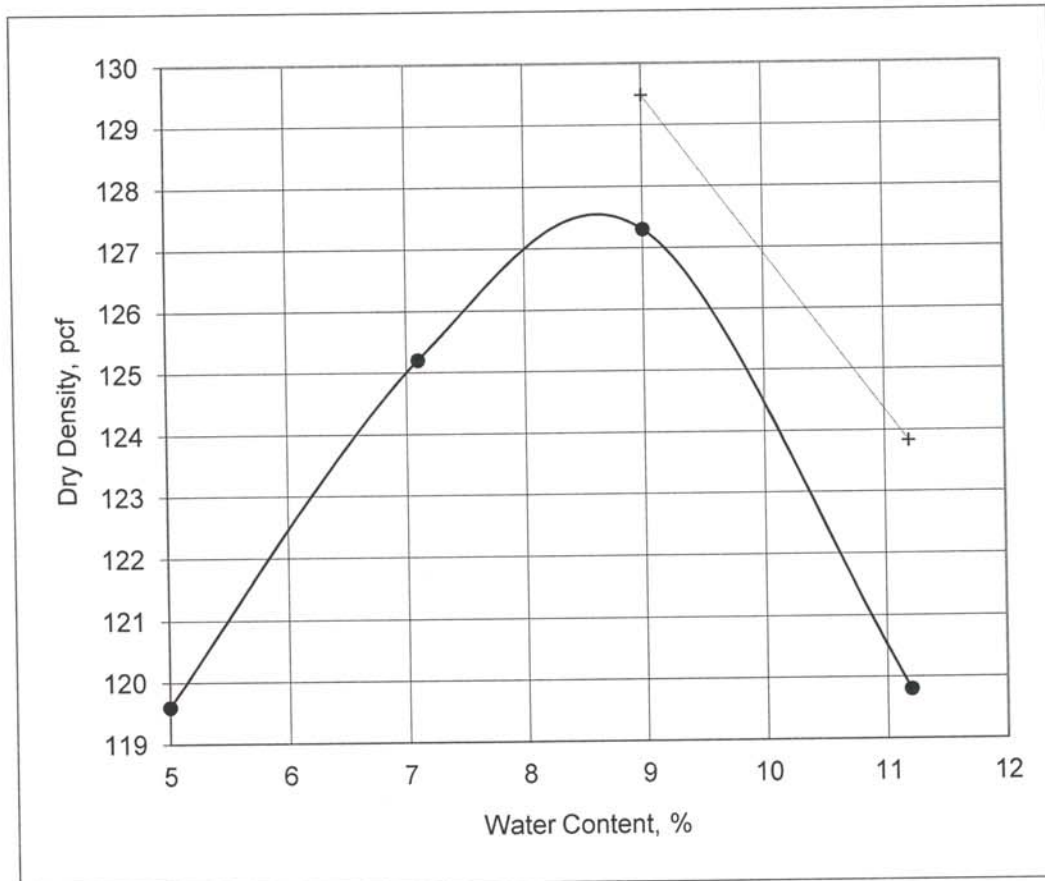
PLATE NO: B-10C



LABORATORY COMPACTION REPORT

(408)-452-9000
Parikh Consultants Inc.

Project:	MINIMUM ARRA - FUNDED SEGMENT - CHST	Date:	11/23/2011
Client:	AECOM	Project #:	210126.10
Sample #:	S0005R	Depth:	2'-5'
		Lab #:	M837
Location/Source:	Fresno / Native	Sample Date:	
Material:	Silty Fine Sand, brown	Sampled By:	



ASTM Test Designation: ☐ D 698 ☒ D 1557 Method: ☒ A ☐ B ☐ C

100 % Saturation Curve-Estimated Specific Gravity: 2.55

Laboratory Test Results

Trial #	1	2	3	4
Water Content, %	5.0	7.1	9.0	11.2
Dry Density, pcf	119.6	125.2	127.3	119.8

MAXIMUM DRY DENSITY, pcf:	127.5	OPTIMUM MOISTURE, %:	8.6
---------------------------	-------	----------------------	-----

Comments:

Report By: Prav D Dayah

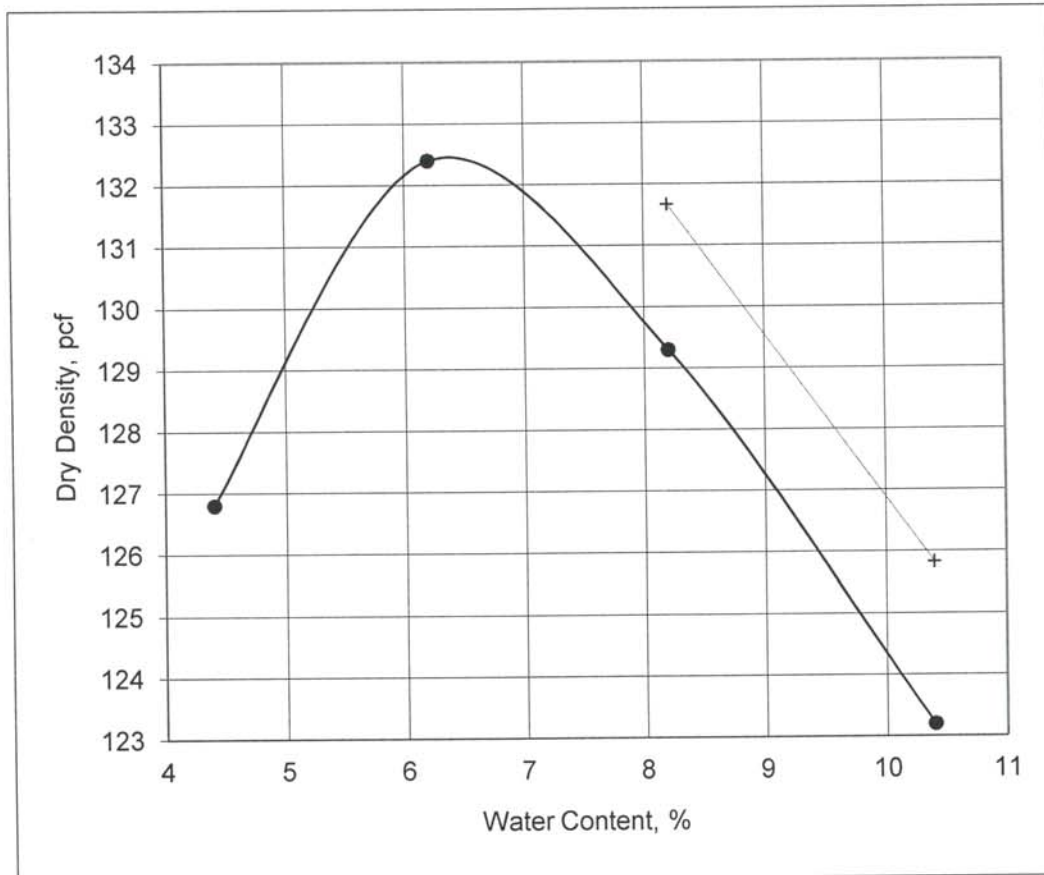
PLATE NO: B-10D



LABORATORY COMPACTION REPORT

(408)-452-9000
Parikh Consultants Inc.

Project:	MINIMUM ARRA - FUNDED SEGMENT - CHST			Date:	12/26/2011
Client:	AECOM			Project #:	210126.10
Sample #:	S0006A	Depth:	2'-5'	Lab #:	M837
Location/Source:	Fresno / Native			Sample Date:	
Material:	Silty Fine Sand, brown			Sampled By:	



ASTM Test Designation: ☐ D 698 ☒ D 1557 Method: ☒ A ☐ B ☐ C

100 % Saturation Curve-Estimated Specific Gravity:

2.55

Laboratory Test Results

Trial #	1	2	3	4
Water Content, %	4.4	6.2	8.2	10.4
Dry Density, pcf	126.8	132.4	129.3	123.2

MAXIMUM DRY DENSITY, pcf: 132.5

OPTIMUM MOISTURE, %: 6.4

Comments:

Report By: Prav D Dayah

PLATE NO: B-10E

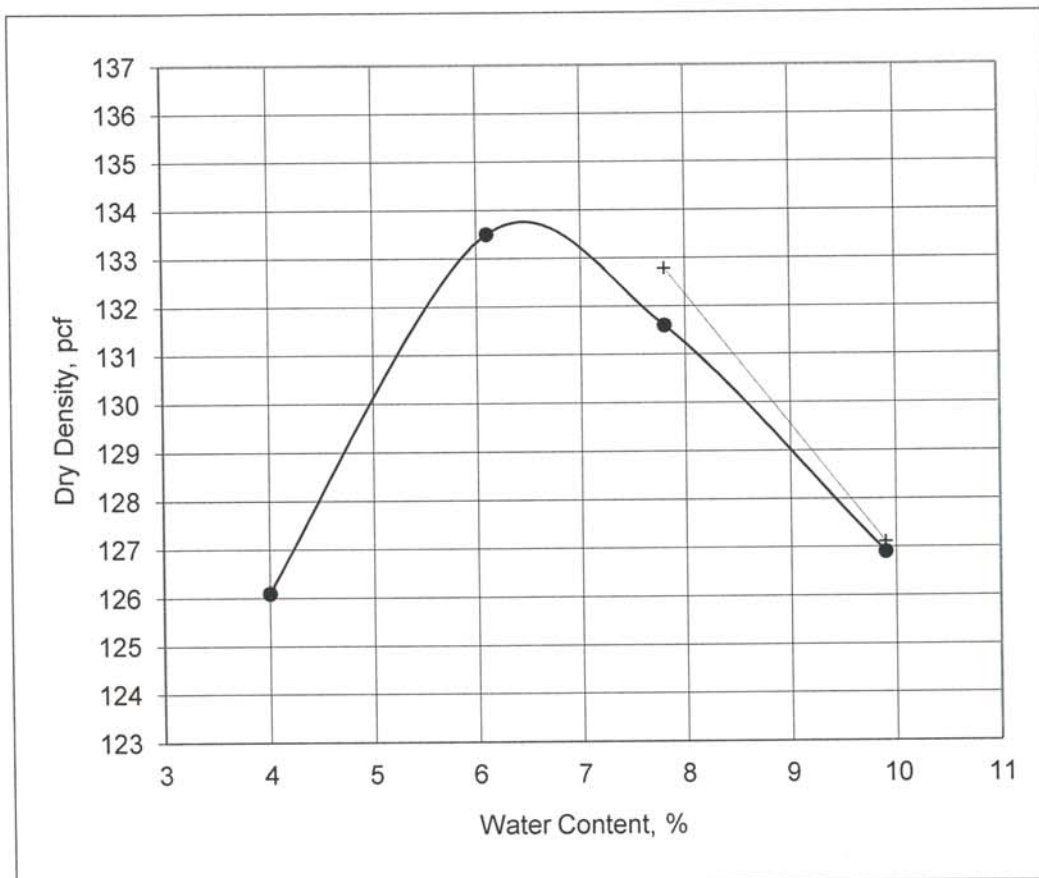


LABORATORY COMPACTION REPORT

(408)-452-9000

Parikh Consultants Inc.

Project:	MINIMUM ARRA - FUNDED SEGMENT - CHST	Date:	11/26/2011
Client:	AECOM	Project #:	210126.10
Sample #:	S0008A	Depth:	2'-5'
		Lab #:	M837
Location/Source:	Fresno / Native	Sample Date:	
Material:	Silty Fine Sand, brown	Sampled By:	



ASTM Test Designation: ☐ D 698 ☒ D 1557 Method: ☒ A ☐ B ☐ C

100 % Saturation Curve-Estimated Specific Gravity:

2.55

Laboratory Test Results

Trial #	1	2	3	4
Water Content, %	4.0	6.1	7.8	9.9
Dry Density, pcf	126.1	133.5	131.6	126.9

MAXIMUM DRY DENSITY, pcf:

133.7

OPTIMUM MOISTURE, %:

6.5

Comments:

Report By: Prav D Dayah

PLATE NO: B-10F

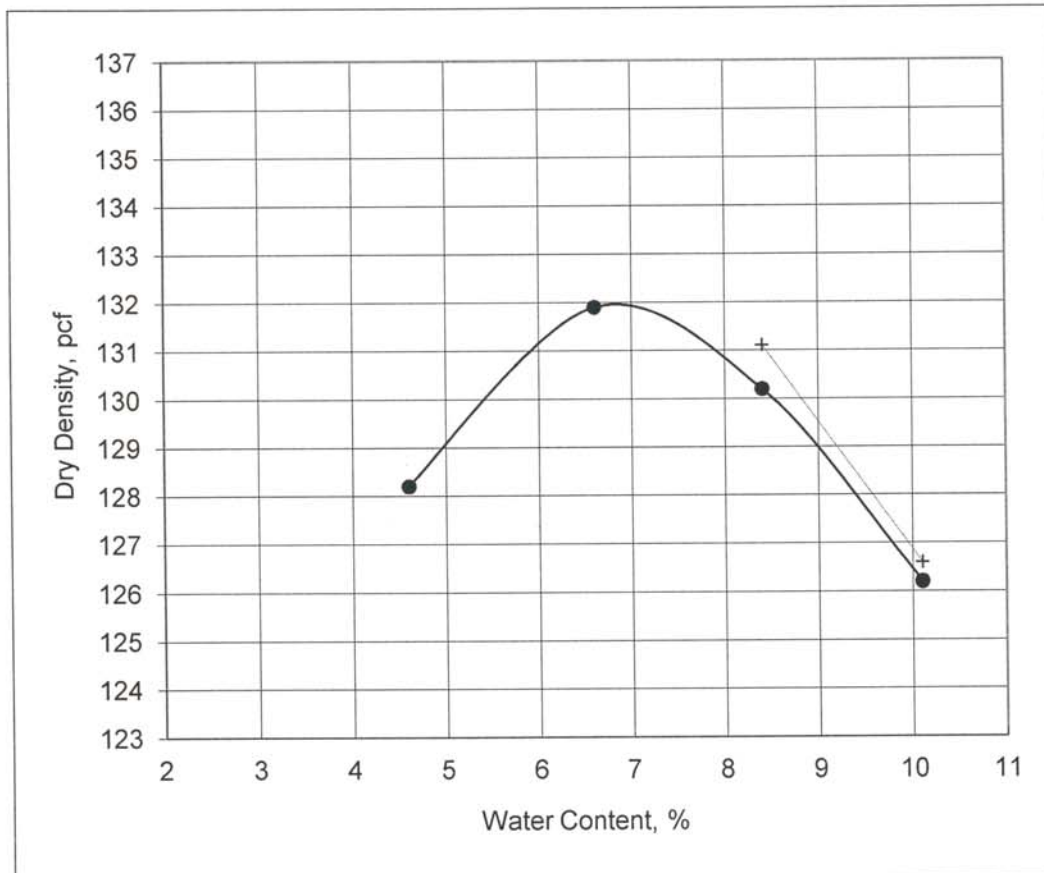


LABORATORY COMPACTION REPORT

(408)-452-9000

Parikh Consultants Inc.

Project:	MINIMUM ARRA - FUNDED SEGMENT - CHST			Date:	11/27/11
Client:	AECOM			Project #:	210126.10
Sample #:	S0009A	Depth:	2'-5'	Lab #:	M837
Location/Source:	Fresno / Native			Sample Date:	
Material:	Silty Fine Sand, brown			Sampled By:	



ASTM Test Designation: ☐ D 698 ☒ D 1557 Method: ☒ A ☐ B ☐ C

100 % Saturation Curve-Estimated Specific Gravity:

2.55

Laboratory Test Results

Trial #	1	2	3	4
Water Content, %	4.6	6.6	8.4	10.1
Dry Density, pcf	128.2	131.9	130.2	126.2

MAXIMUM DRY DENSITY, pcf: 132.0

OPTIMUM MOISTURE, %: 6.8

Comments:

Report By: Prav D Dayah

PLATE NO: B-10G

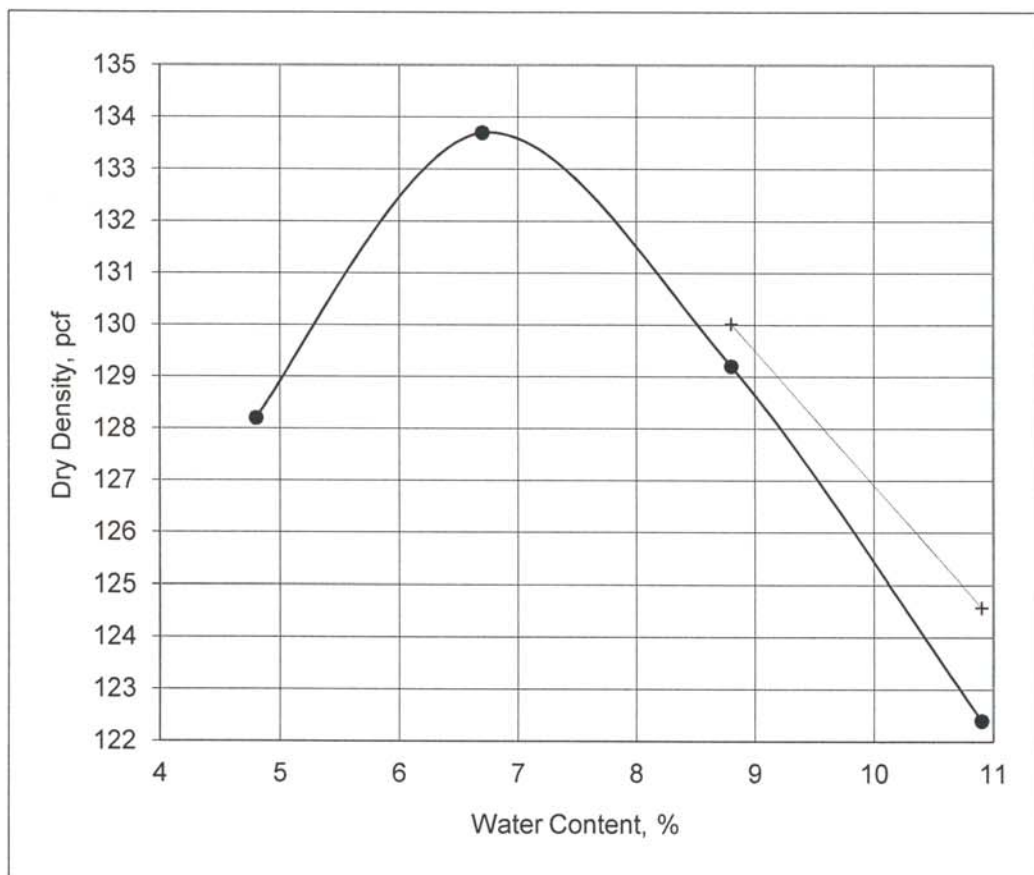


LABORATORY COMPACTION REPORT

(408)-452-9000

Parikh Consultants Inc.

Project:	MINIMUM ARRA - FUNDED SEGMENT - CHST			Date:	11/27/11
Client:	AECOM			Project #:	210126.10
Sample #:	S0010A	Depth:	2'-5'	Lab #:	M837
Location/Source:	Fresno / Native			Sample Date:	
Material:	Silty Fine Sand, brown			Sampled By:	



ASTM Test Designation: ☐ D 698 ☒ D 1557 Method: ☒ A ☐ B ☐ C

100 % Saturation Curve-Estimated Specific Gravity:

2.55

Laboratory Test Results

Trial #	1	2	3	4
Water Content, %	4.8	6.7	8.8	10.9
Dry Density, pcf	128.2	133.7	129.2	122.4

MAXIMUM DRY DENSITY, pcf: 133.8 OPTIMUM MOISTURE, %: 6.8

Comments:

Report By: Prav D Dayah

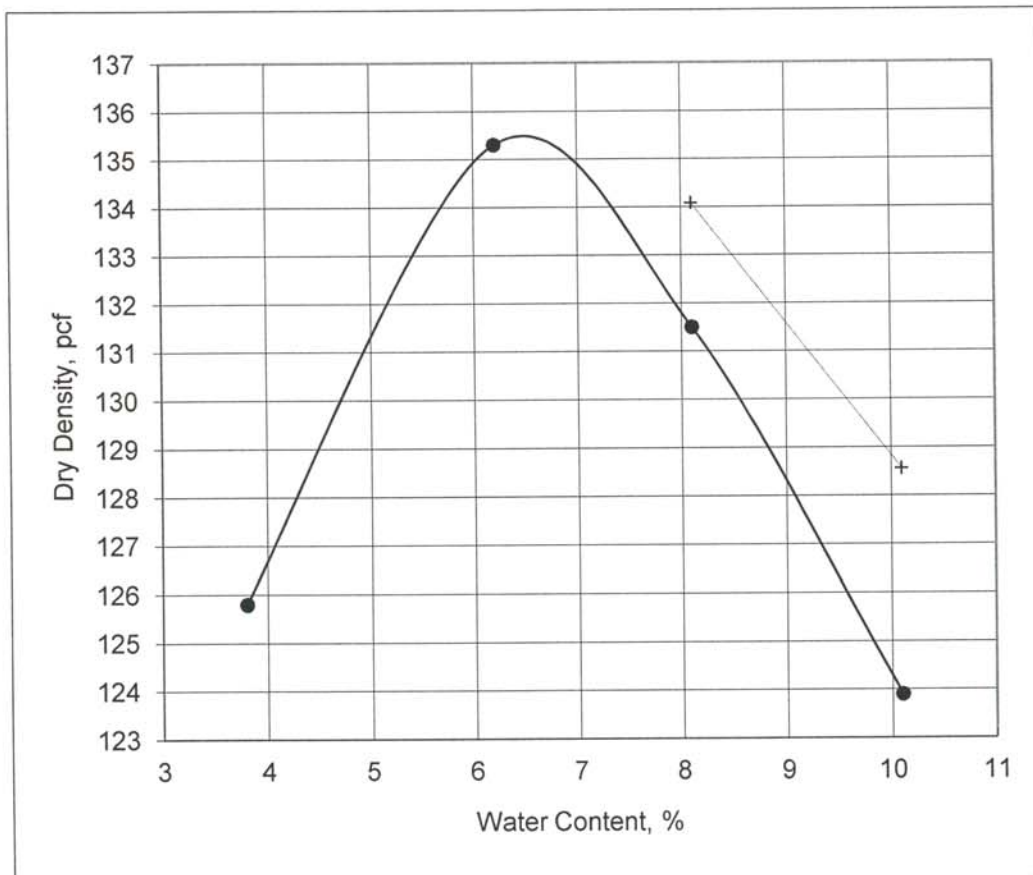
PLATE NO: B-10H



LABORATORY COMPACTION REPORT

(408)-452-9000
Parikh Consultants Inc.

Project:	MINIMUM ARRA - FUNDED SEGMENT - CHST	Date:	11/27/11
Client:	AECOM	Project #:	210126.10
Sample #:	S0007A	Depth:	2'-5'
		Lab #:	M837
Location/Source:	Fresno / Native	Sample Date:	
Material:	Silty Fine Sand, brown	Sampled By:	



ASTM Test Designation: ☐ D 698 ☒ D 1557 Method: ☒ A ☐ B ☐ C

100 % Saturation Curve-Estimated Specific Gravity:

Laboratory Test Results

Trial #	1	2	3	4
Water Content, %	3.8	6.2	8.1	10.1
Dry Density, pcf	125.8	135.3	131.5	123.9

MAXIMUM DRY DENSITY, pcf: **135.5** OPTIMUM MOISTURE, %: **6.5**

Comments:

Report By: Prav D Dayah

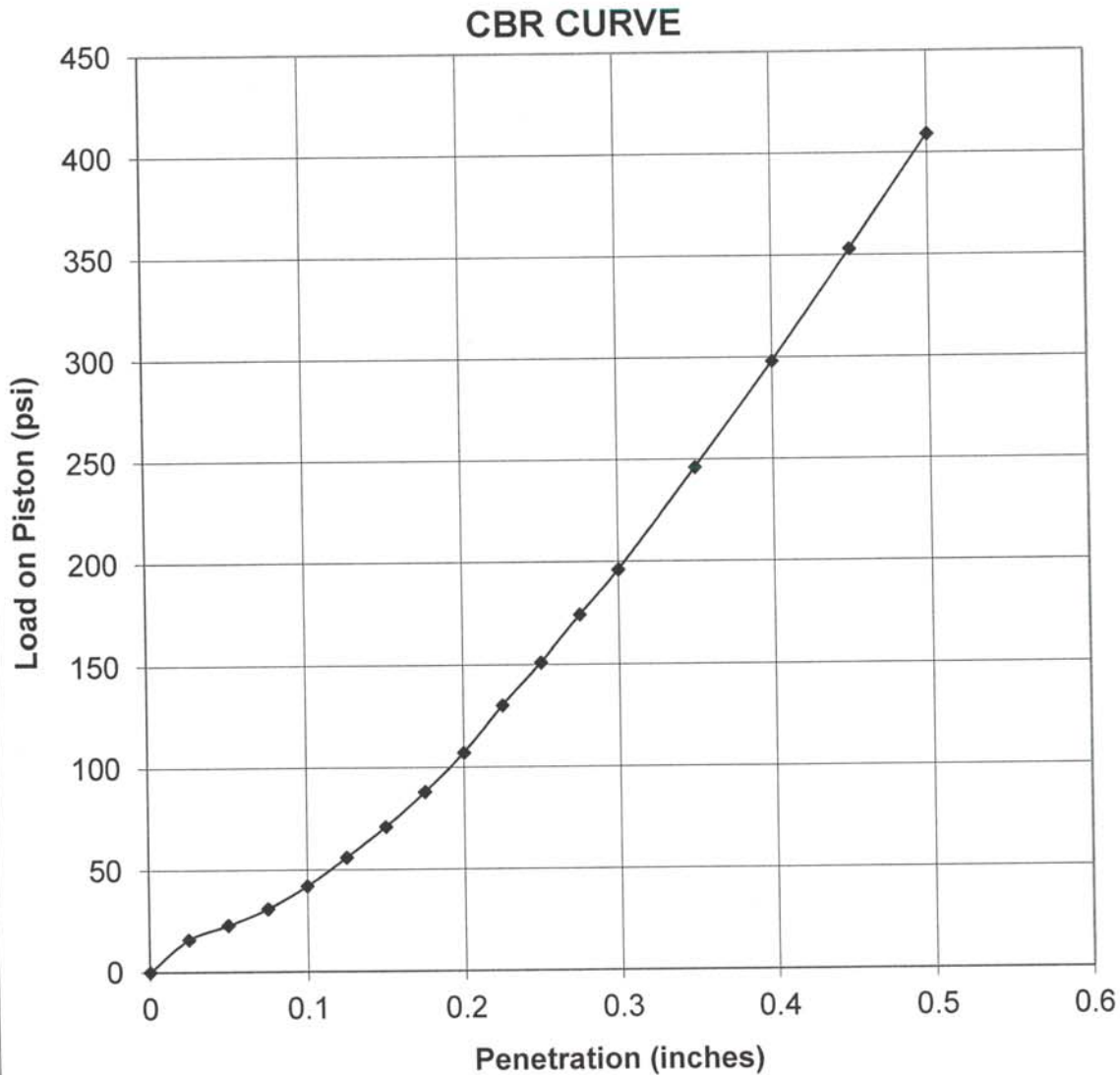
PLATE NO: B-10I



CALIFORNIA BEARING RATIO
ASTM D1883

Project Name: MINIMUM ARRA - FUNDED SEGMENT - CHST
Sample #: S0002A Depth: 2'-5'
Mat'l Description: Silty Sand, brown
% Quick Lime (SS Lime): None

Project #: 2009-138-400
Lab #: M837
Date 12/7/2011
Tested By: PDD



Method of Preparation D1557 - Soaked

Max. dry density (pcf) 132.2
Opt. % m/c 6.8

Before Soak	
Dry Density (pcf)	127.4
% m/c before compaction	9.0
% m/c after compaction	8.8

After Soak	
Dry Density (pcf)	127.5
% m/c top 1"	9.1
Average	9.1

Swell % 0.0

Surcharge Wt.(lbs) 10

CBR VALUE	
.100"	4.2
.200"	7.1

PLATE NO: B-11A

PARIKH CONSULTANTS, INC.



CALIFORNIA BEARING RATIO
ASTM D1883

Project Name: MINIMUM ARRA - FUNDED SEGMENT - CHST

Project #: 2009-138-400

Sample #: S0005R

Depth: 2'-5'

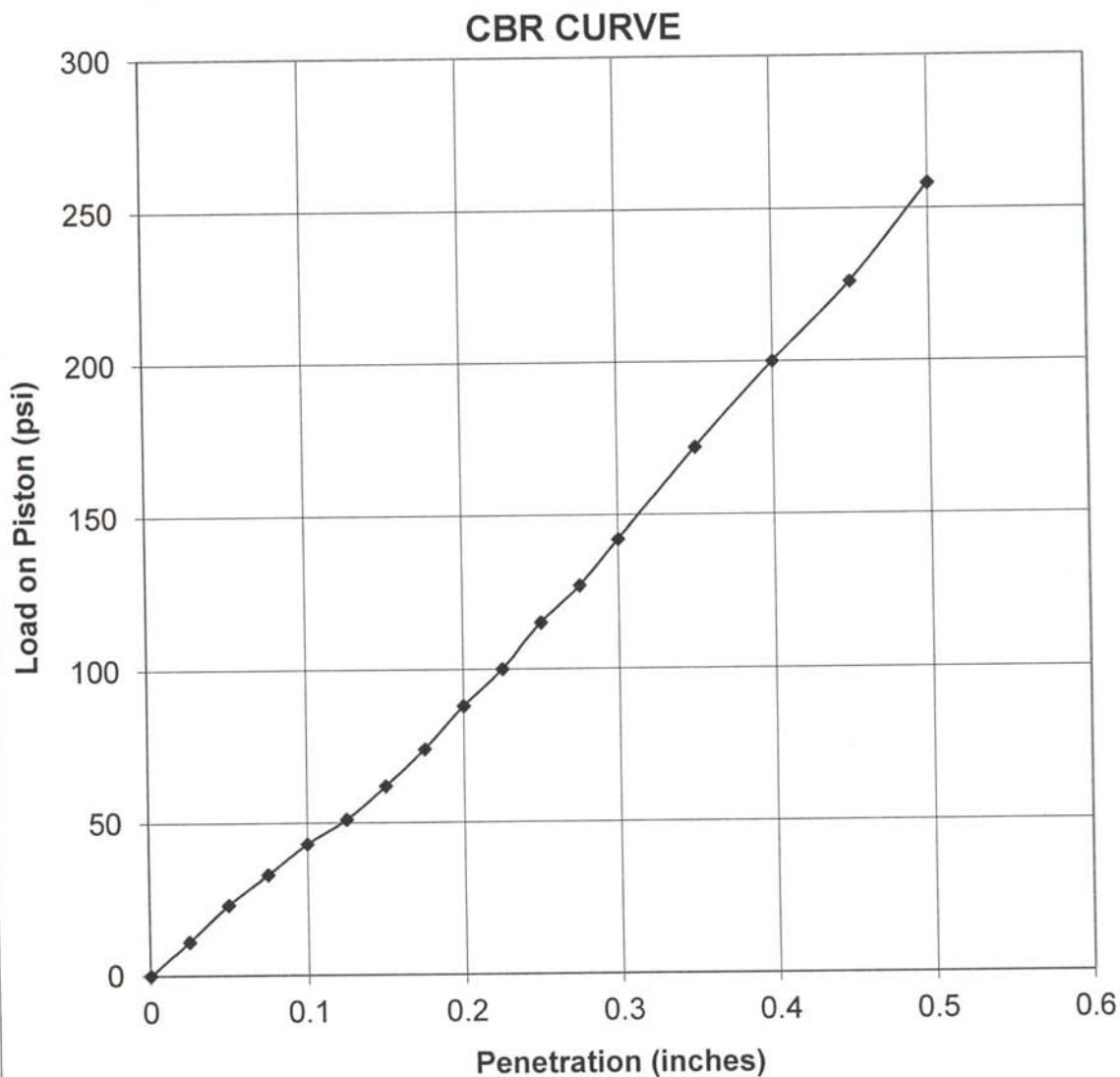
Lab #: M837

Mat'l Description: Silty Sand, brown

Date 12/7/2011

% Quick Lime (SS Lime): None

Tested By: PDD



Method of Preparation D1557 - Soaked

Max. dry density (pcf)
Opt. % m/c

127.5
8.6

Before Soak	
Dry Density (pcf)	122.2
% m/c before compaction	10.9
% m/c after compaction	10.7

After Soak	
Dry Density (pcf)	122.5
% m/c top 1"	11.0
Average	10.8

Swell % 0.0

Surcharge Wt.(lbs) 10

CBR VALUE	
.100"	4.3
.200"	5.9

PLATE NO: B-11B

PARIKH CONSULTANTS, INC.

APPENDIX D

URS/HMM/Arup Joint Venture (URS)
GEOTECHNICAL DATA (Field & Laboratory Data only)
(Part of Volume 2 of 2)

APPENDIX D

GEOTECHNICAL DATA WEST CLINTON AVENUE TO EAST AMERICAN AVENUE FRESNO, CALIFORNIA CALIFORNIA HIGH-SPEED TRAIN PROJECT

A geotechnical investigation was performed by URS/HMM/Arup Joint Venture (URS) for the approximately 9 miles of CHST track from West Clinton Avenue to about East American Avenue in Fresno, California (Contract Package 1, Fresno to Bakersfield segment). The proposed alignment includes a combination of at-grade tracks, grade separation structures, overcrossings, undercrossings, and aerial structures. The design requires shallow and deep foundations, deep excavations on the order of 55 feet, retaining walls, and embankments. The final Geotechnical Data Report (GDR) was issued by URS in February 2012.

The field geotechnical investigation was conducted between October 10 and 28, 2011, and consisted of 17 soil borings and 44 Cone Penetration Tests (CPTs). At the completion of drilling, 7 boreholes were converted to standpipe piezometers for long-term groundwater monitoring. In situ testing performed during the field exploration included shear wave velocity measurements in 4 boreholes and 6 CPTs, and pore water pressure dissipation tests in 19 CPTs. A laboratory test program was performed on representative soil samples to obtain index and engineering properties.

The final GDR by URS has been distributed to proper parties by the California High-Speed Rail Authority. The main body of the final GDR and some Appendices (geotechnical data from the field exploration) are attached for easy reference. All descriptions and appendices attached are from the final GDR issued in February 2012 by URS. It should be recognized that the final GDR by URS must be read in its entirety for a comprehensive understanding of the project and findings of the investigation.

ATTACHEMENTS:

1. Final Geotechnical Data Report – February 2012 by URS (Main Body)
2. Exploratory Borehole Records (Appendix B)
3. Cone Penetration Test Records (Appendix C)
4. PS Logging Records - GEOVision Geophysical Services (Appendix D)

Appendix B

Exploratory Borehole Records

For gINT Database, see CD

Table B-1
Summary of Exploratory Borehole Locations, Depths, and In Situ Testing

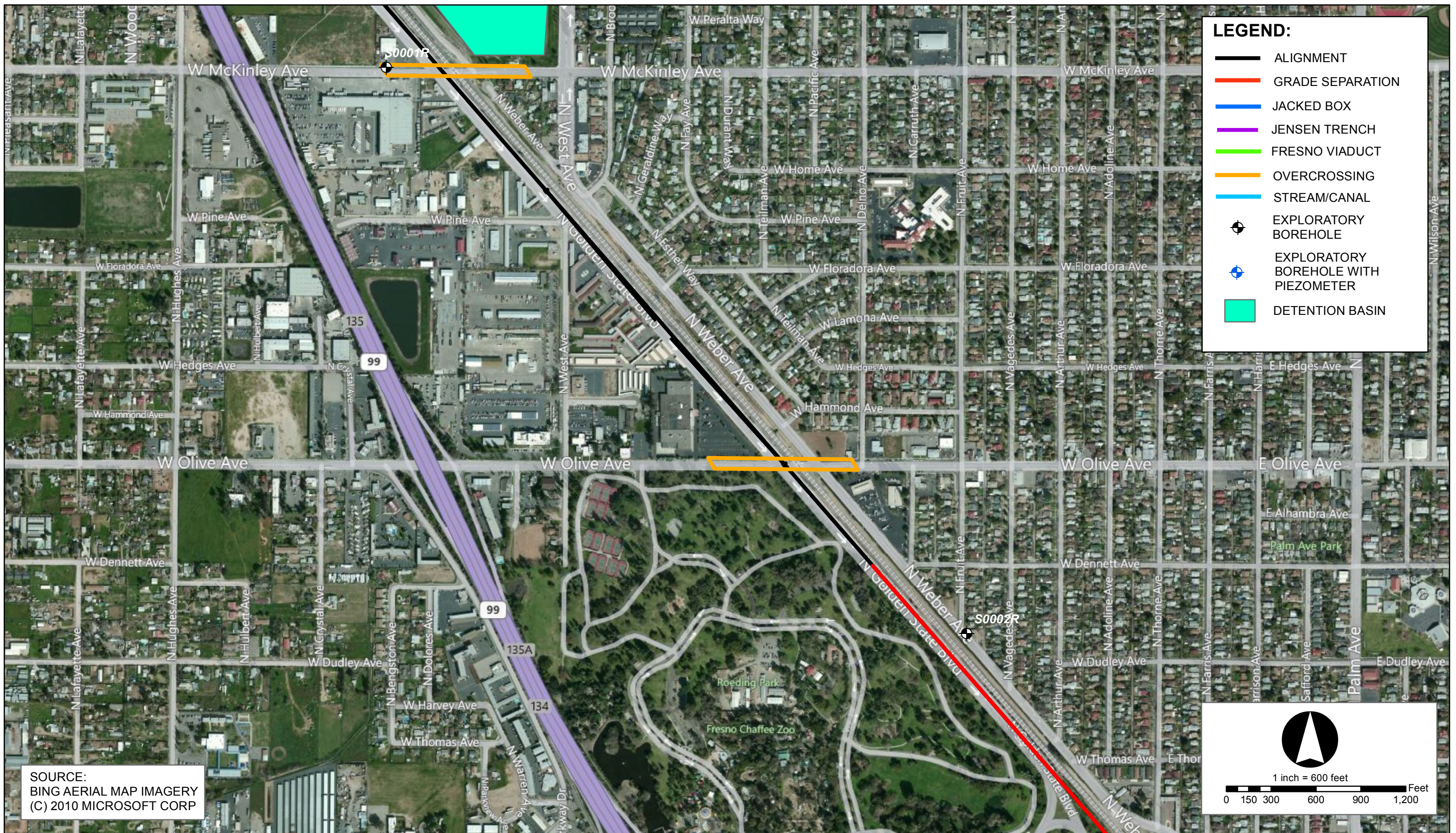
Borehole ID	Elevation (NAVD88) (ft)	Northing (NAD83) (ft)	Easting (NAD83) (ft)	Continuous Sampling Interval(s) (ft)	Total Depth of Drilling (ft)	In Situ Testing	
						PS ^[1]	PZ ^[2]
S0001R	287.40	2,162,577	6,318,315	5 to 15.5	51.5		
S0002R	290.40	2,158,798	6,322,192	5 to 15.5	81.5		
S0003R	288.00	2,157,251	6,323,233	5 to 15.5	82.0		✓
S0004R	283.70	2,156,593	6,324,256	5 to 15.5; 50 to 56	81.5		
S0005R	285.30	2,155,457	6,325,239	5 to 15.5; 45 to 51	95.0	✓	✓
S0006R	287.60	2,154,688	6,325,497	5 to 15.5; 35 to 41	81.5		
S0007R	285.10	2,152,087	6,327,474	5 to 15.5	81.5		
S0010R	286.10	2,150,922	6,328,342	5 to 15.5	165.0	✓	✓
S0012R	287.60	2,148,215	6,330,774	5 to 15.5	165.0	✓	
S0013AR	286.10	2,146,714	6,332,312	5 to 15.5	150.0		✓
S0014AR	285.40	2,143,960	6,334,724	5 to 15.5	81.5		
S0014R	284.60	2,145,253	6,333,705	5 to 15.5	81.5		
S0015R	286.70	2,141,424	6,337,012	5 to 15.5	51.5		
S0016R	288.80	2,138,780	6,338,686	None	160.0		✓
S0017R	290.50	2,136,102	6,340,038	None	151.5		✓
S0018R	305.80	2,134,428	6,340,369	None	165.0	✓	✓
S0019R	292.50	2,125,499	6,341,566	5 to 15.5	51.5		

^[1] PS: P- and s-wave suspension velocity logging
^[2] PZ: standpipe piezometer

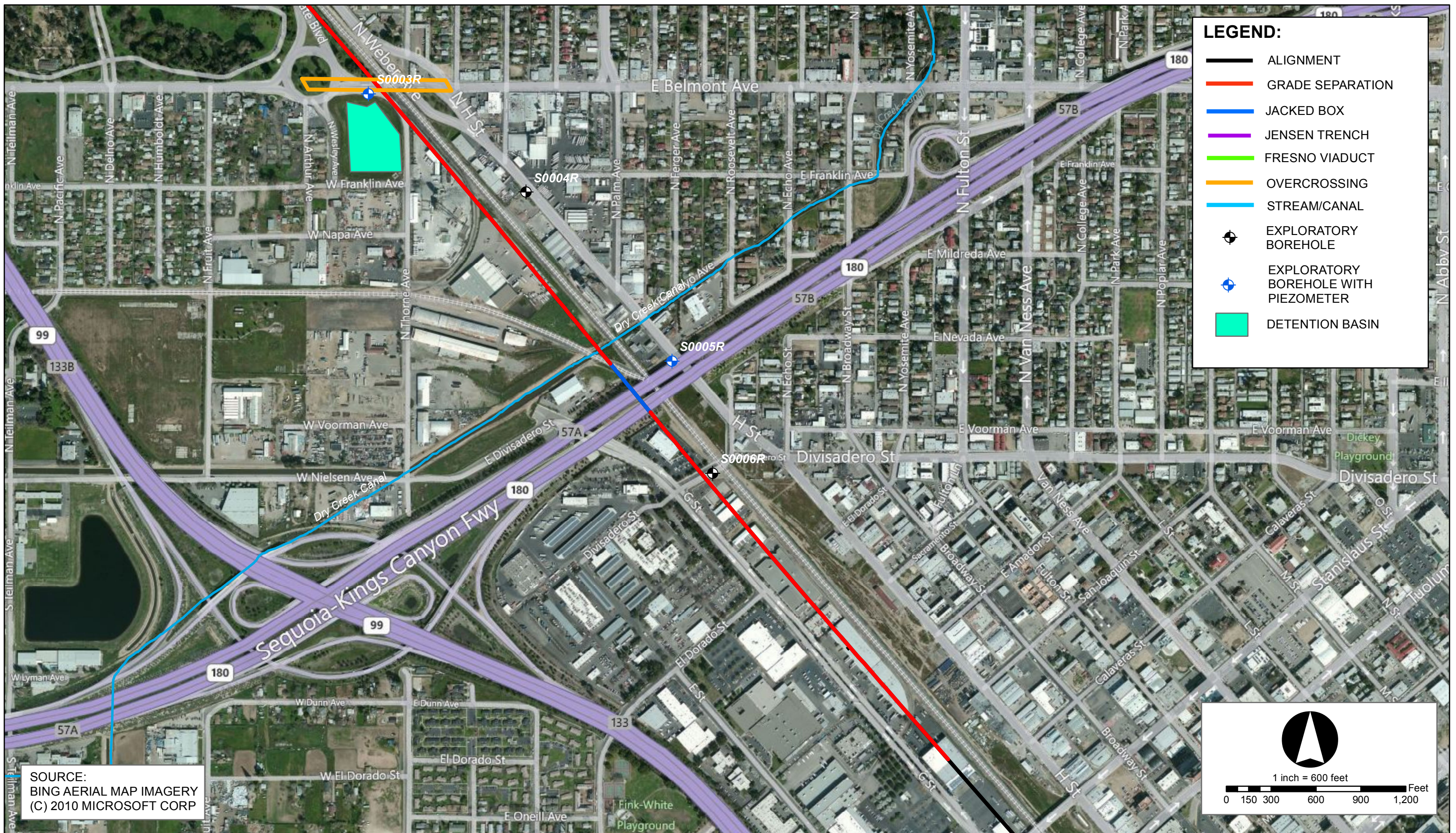
06/29/2012 ADDENDUM 3 - RFP HSR 11-16



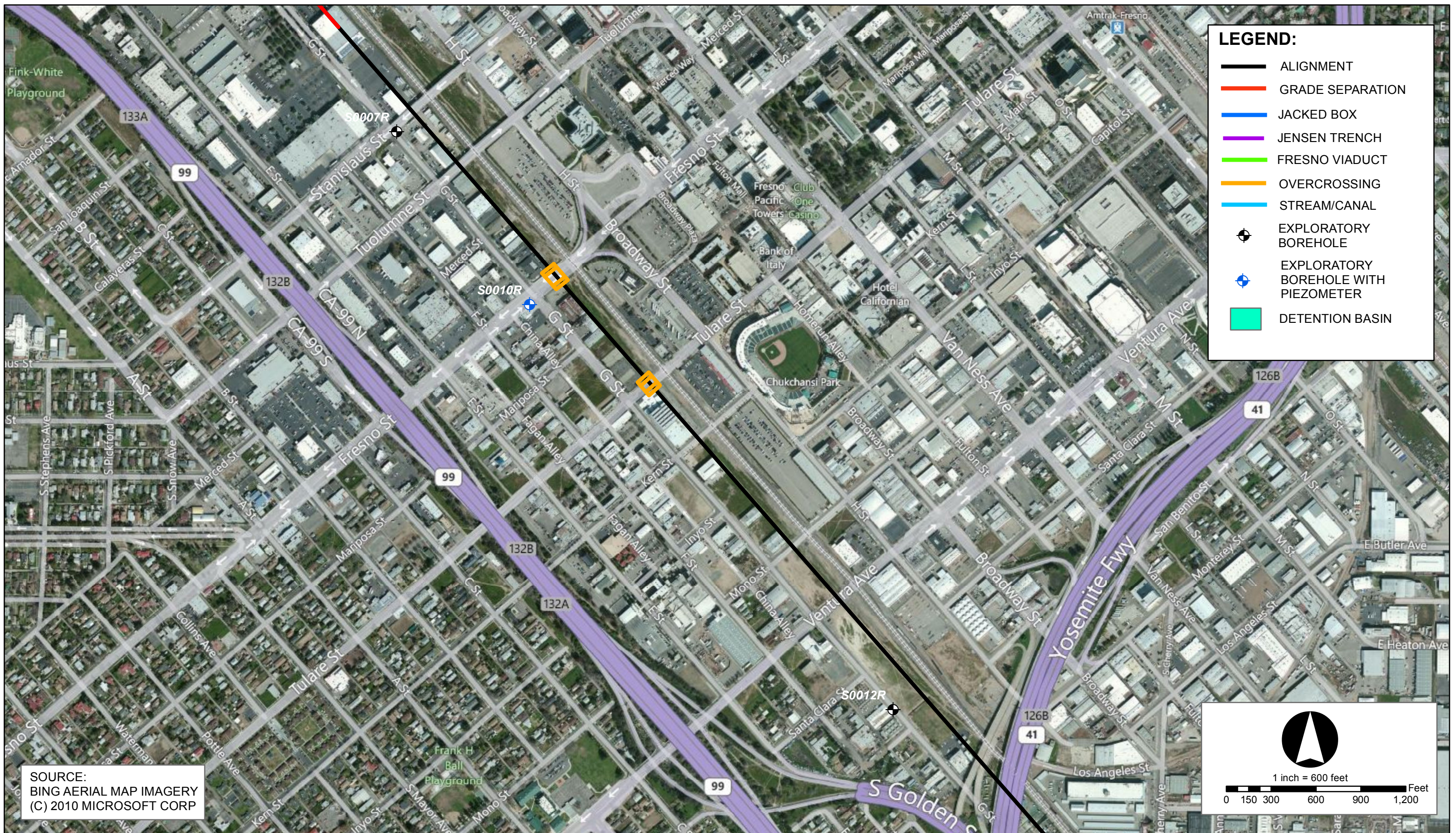
06/29/2012 ADDENDUM 3 - RFP HSR 11-16



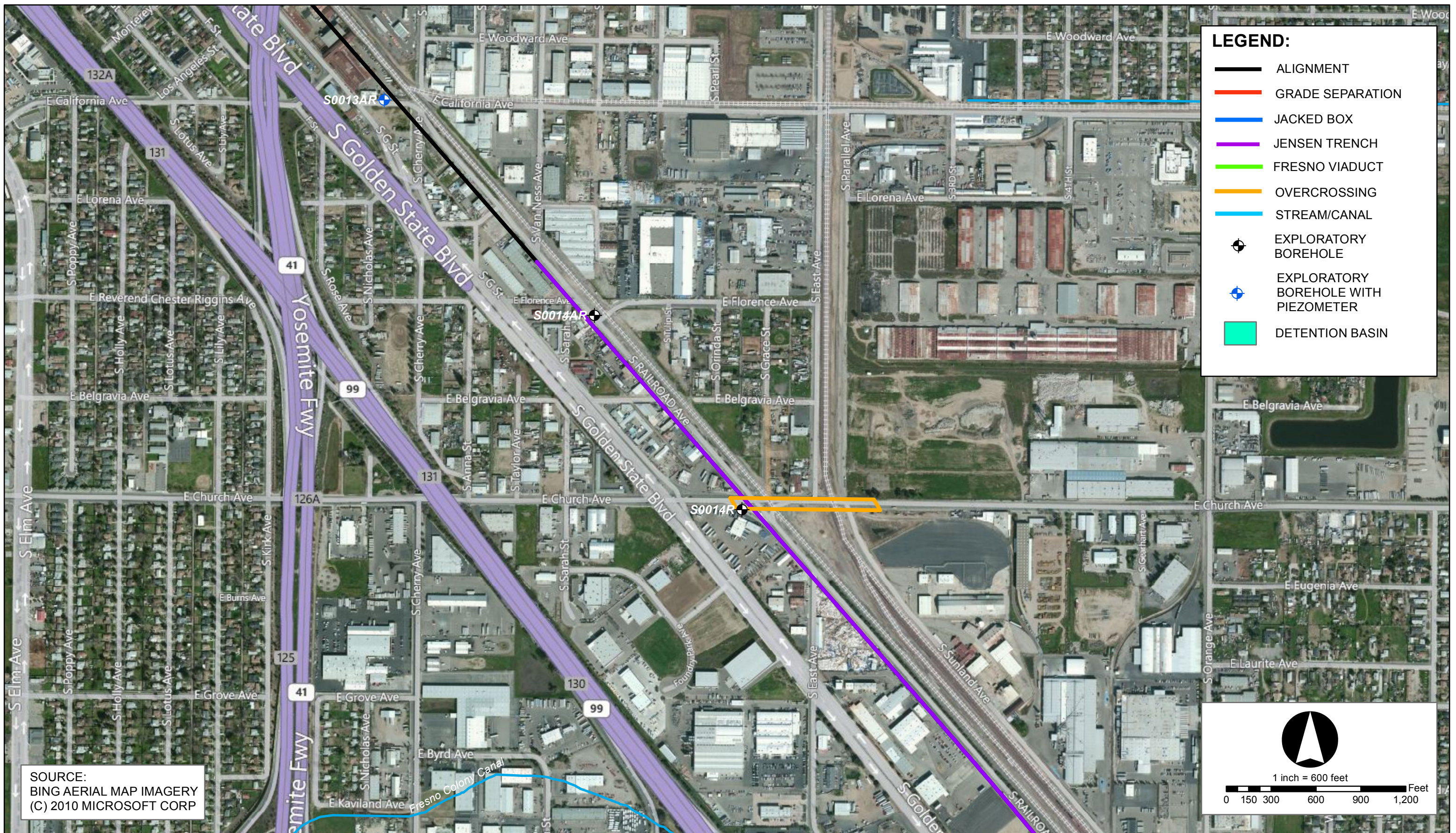
06/29/2012 ADDENDUM 3 - RFP HSR 11-16



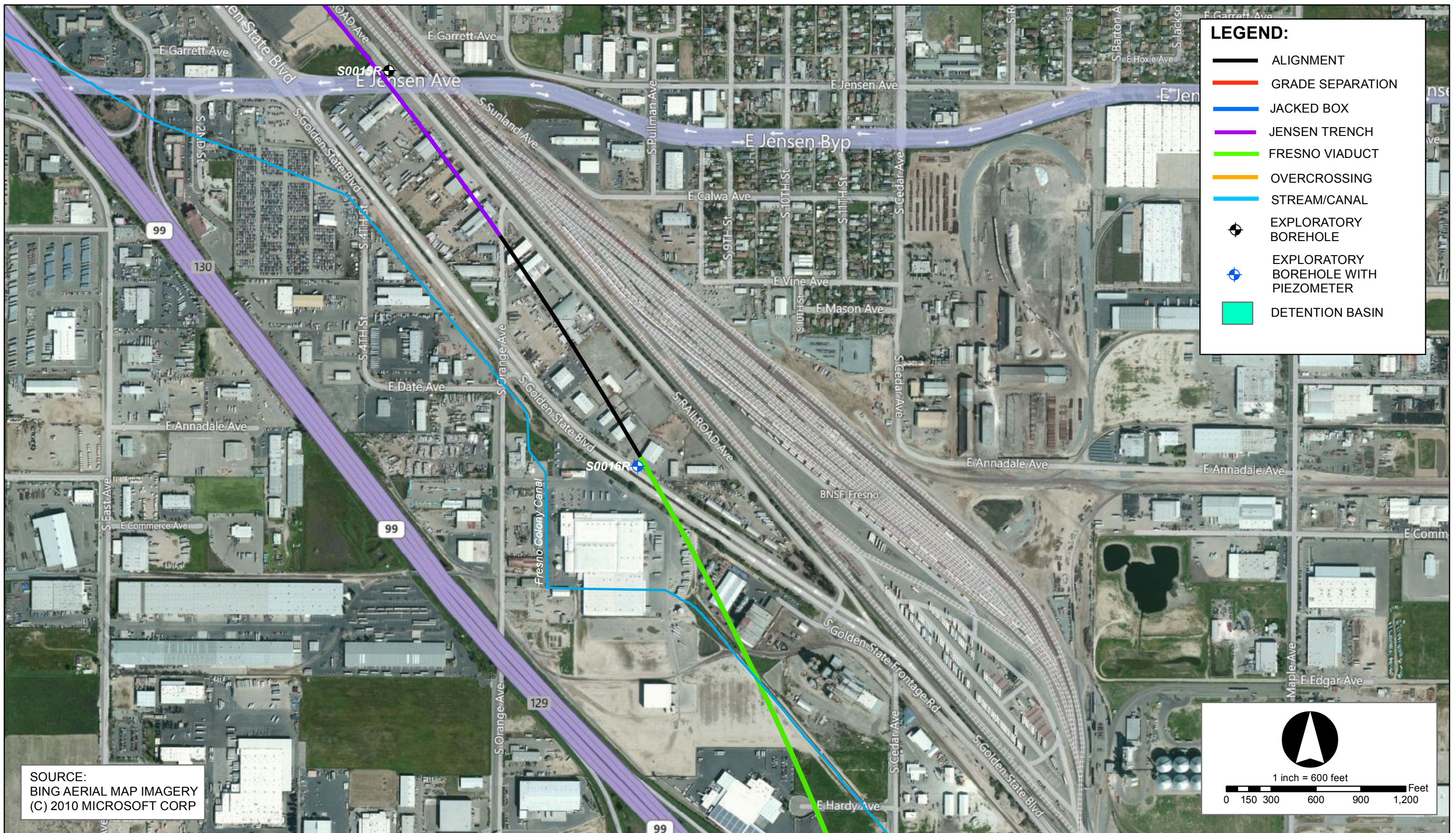
06/29/2012 ADDENDUM 3 - RFP HSR 11-16



06/29/2012 ADDENDUM 3 - RFP HSR 11-16



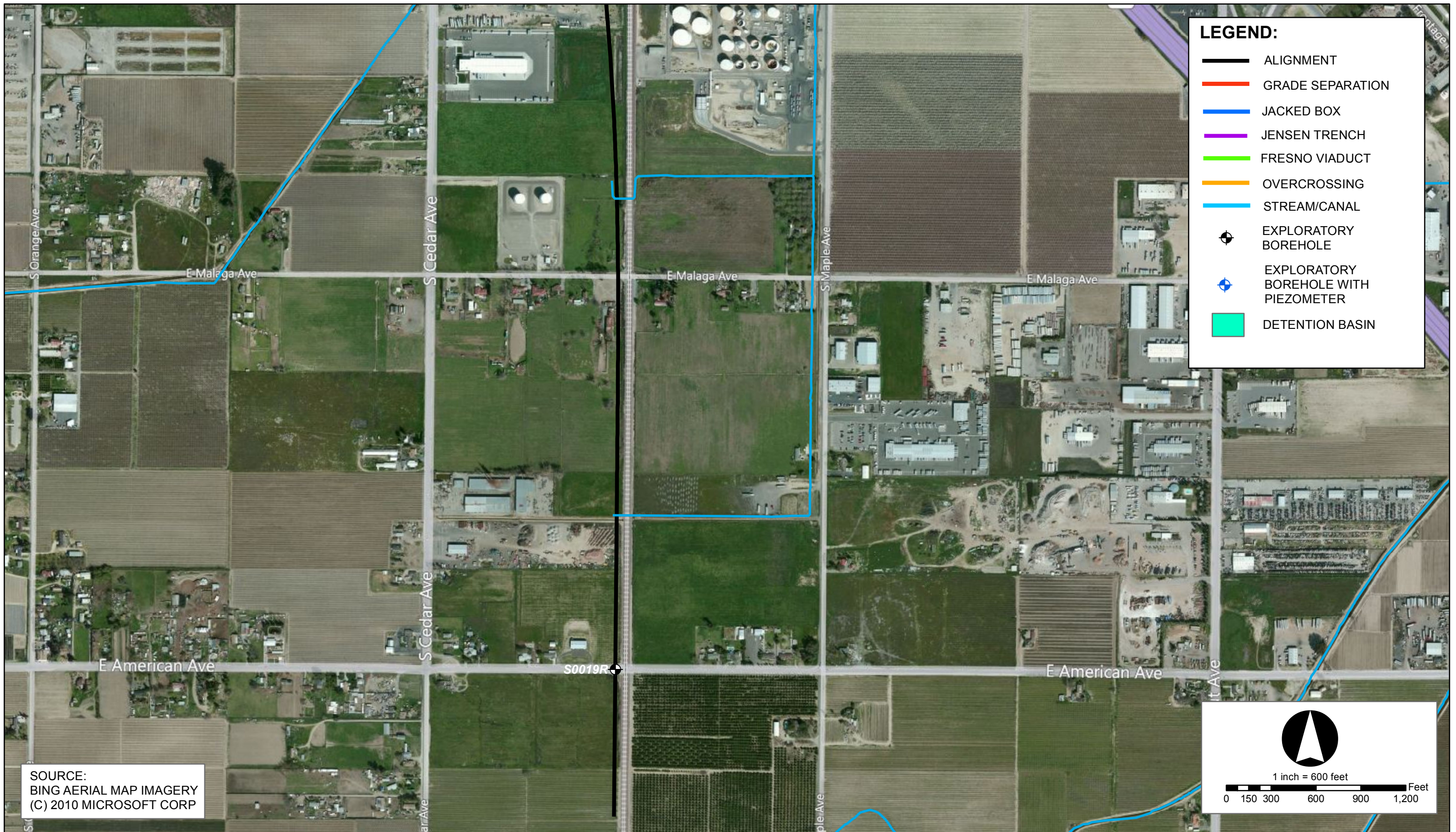
06/29/2012 ADDENDUM 3 - RFP HSR 11-16



06/29/2012 ADDENDUM 3 - RFP HSR 11-16



06/29/2012 ADDENDUM 3 - RFP HSR 11-16

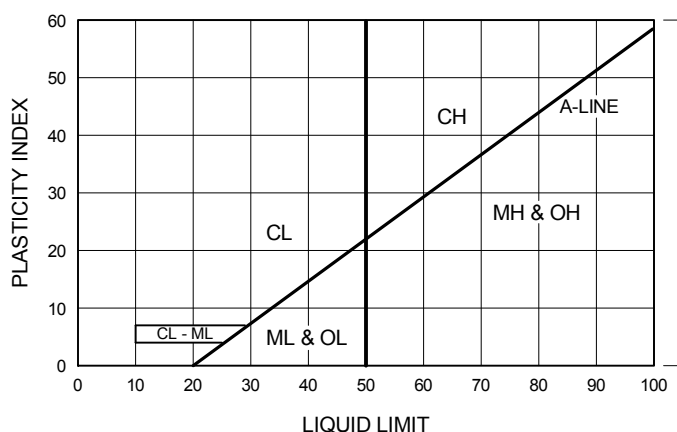


06/29/2012 ADDENDUM 3 - RFP HSR 11-16

INDEXED SOIL CLASSIFICATIONS

GRAPHIC	SYMBOL	DESCRIPTION	MAJOR DIVISIONS				
	GW	WELL-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	CLEAN GRAVELS (LITTLE OR NO FINES)	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	COARSE-GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	THE NO. 200 U.S. STANDARD SIEVE IS ABOUT THE SMALLEST PARTICLE VISIBLE TO THE NAKED EYE	
	GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES					
	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)				
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES					
	SW	WELL-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES	CLEAN SANDS (LITTLE OR NO FINES)	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE			
	SP	POORLY-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES					
	SM	SILTY SANDS, SAND-SILT MIXTURES	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)				
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES					
	ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	SILTS & CLAYS LIQUID LIMIT LESS THAN 50		FINE-GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE		
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS					
	OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY					
	MH	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF HIGH PLASTICITY	SILTS & CLAYS LIQUID LIMIT GREATER THAN 50				
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS					
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS					
	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	HIGHLY ORGANIC SOILS				
	OS	OILY SEDIMENTS					

PLASTICITY CHART



KEY TO TEST DATA

TV = POCKET TORVANE

PP = POCKET PENETROMETER

KEY TO SAMPLER TYPE

BULK

SPT = STANDARD PENETRATION TEST SAMPLER



**SOIL CLASSIFICATION CHART
AND KEY TO TEST DATA**

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-10-11	COMPLETION DATE Oct-11-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2162577.132 / E6318315.079 (National Grid)		HOLE ID S0001R
DRILLING CONTRACTOR/DRILLER Pitcher/O. Espinosa			IN-SITU TESTING		SURFACE ELEVATION 287.44 ft (NAVD88)
DRILLING METHOD AUGER(0'-14'), MUD ROTARY(14'-51.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER DURING DRILLING READINGS	AFTER DRILLING (DATE) 13.5 ft (10/10/2011) Not Recorded	TOTAL DEPTH OF BORING 51.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method Casing Depth	Remarks/ Other Tests
	0		ASPHALT (4") (AC).	S01	0			60	60								Hand auger to 5.0'
			SILTY SAND (SM); brown; moist to dry; fine; trace fine subangular GRAVEL; trace SILT; [FILL].							31.9							Modified Proctor: Max $\gamma_d = 136.6$ pcf Optimum $W_L = 6.4\%$
282.44	5		SILTY SAND (SM); medium dense; brown; moist to dry; fine to medium; little fines; weak cementation; [ALLUVIUM].	S02	5	33-16-16	32	18	6								
					6.5												
				S03	6.5	10-11-14	25	18	18								
					8					21.2							
			Poorly graded SAND with SILT (SP-SM); brown; moist to dry; fine; few SILT; weak cementation.	S04	8	10-10-10	20	18	18								
					9.5					8.7							Installed 8.5' of 5" casing
277.44	10		9.5', grades to reddish brown; moist; some SILT.	S05	9.5	9-7-7	14	18	18								
			10.5', grades yellowish brown; trace fines.		11												
			SANDY SILT (ML); very stiff; reddish brown; wet; some SAND; weak cementation.	S06	11	16-11-12	23	18	18	69.4							
					12.5												
			SILTY SAND (SM); dense; light yellowish brown; moist to dry; fine; some SILT; weak cementation.	S07	12.5	19-23-17	40	18	18	40.4/32.4							Driller measures water level at 13.5'
					14												Switch to mud rotary at 14.0' (4.875" tricone bit)
272.44	15		14.0', medium dense; brown; wet; subangular GRAVEL; fine to coarse; occasional wood debris.	S08	14	3-4-14	18	18	18	35.2							
					15.5												

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0001R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 1 of 3	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-10-11	COMPLETION DATE Oct-11-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2162577.132 / E6318315.079 (National Grid)		HOLE ID S0001R
DRILLING CONTRACTOR/DRILLER Pitcher/O. Espinosa			IN-SITU TESTING		SURFACE ELEVATION 287.44 ft (NAVD88)
DRILLING METHOD AUGER(0'-14'), MUD ROTARY(14'-51.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER DURING DRILLING READINGS 13.5 ft (10/10/2011)		AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 51.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		SANDY SILT (ML); hard; dark yellowish brown with mottled red; wet; some SAND; low plasticity; weak cementation.		S09	20	18-36-39	75	18	16									
						21.5					63.7		21	3	1.4				
262.44	25		SANDY SILTY CLAY (CL-ML); hard; brown; wet; some fine SAND.		S10	25	18-22-22	44	18	12									
						26.5					50.7	13.1	18	4	2.4				
257.44	30		SILTY SAND (SM); dense; dark yellowish brown; wet; fine to medium; little SILT; weak cementation.		S11	30	18-16-20	36	18	16									
						31.5					28.9								
252.44	35		SILTY SAND (SM); dense; mottled grayish brown and reddish brown; wet; fine; little SILT; weak cementation. Poorly-graded SAND (SP); dense; mottled grayish brown and reddish brown; wet; fine; trace SILT; weak cementation.		S12	35	26-25-24	49	18	12									
						36.5													
247.44	40																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0001R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 2 of 3

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-10-11	COMPLETION DATE Oct-11-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2162577.132 / E6318315.079 (National Grid)		HOLE ID S0001R
DRILLING CONTRACTOR/DRILLER Pitcher/O. Espinosa			IN-SITU TESTING		SURFACE ELEVATION 287.44 ft (NAVD88)
DRILLING METHOD AUGER(0'-14'), MUD ROTARY(14'-51.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER DURING DRILLING READINGS 13.5 ft (10/10/2011)		AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 51.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	40		40.0' - 40.7', layer grades to medium grained; without reddish brown mottling.		S13	40	21-17-24	41	18	14	0.1								
	45					41.5													
242.44	45		SILTY CLAY (CL); hard; grayish brown with reddish brown mottling; wet; trace SAND; low to medium plasticity; weak cementation.		S14	45	8-15-50	65	18	18	97.2	31.9	37	14	2.9				
						46.5													
237.44	50		CLAYEY SILT (CL-ML); hard; grayish brown with frequent reddish brown mottling; wet; fine; trace fine SAND; low plasticity.		S15	50	28-31-47	78	18	15	90.2	22.8	26	5	1.2				
						51.5													
Borehole terminated at a depth of 51.5' on 10/11/2011.																			
For corrosion test results, see Appendix E.																			
Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.																			
See Borehole Log Legend for soil classification chart and key to test data and sampler type.																			
232.44	55																		
227.44	60																		

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0001R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 3 of 3	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-12-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2158798.327 / E6322192.091 (National Grid)		HOLE ID S0002R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING		SURFACE ELEVATION 290.41 ft (NAVD88)
DRILLING METHOD AUGER(0'-5.5'), ROTARY(5.5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 81.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		ASPHALT (6") (AC).	S01	0				60	60									
			AGGREGATE BASE (6") (AB).																
			SILTY SAND (SM); reddish brown; moist; fine; little SILT; trace GRAVEL; rapid dilatancy; [FILL].								23.8								
285.41	5		Poorly graded SAND (SP); reddish brown; moist; fine.	S02	5	3-3-4	7	18	16										
					6.5						19.5	3.9							
			SILTY SAND (SM); very dense; reddish brown; moist; fine; slow dilatancy; calcite seams [ALLUVIUM].	S03	6.5	4-25-47	72	18	16										
			Poorly graded SAND with SILT (SP-SM); very dense; reddish brown; moist; fine; few SILT.		8														
			SILTY SAND (SM); very dense; reddish brown; moist to wet; fine; some SILT.	S04	8	29-52-50	102/9.75"	16	16										
					9.5						42.3/41.3	10.5							
280.41	10		SILTY SAND (SM); very dense; reddish brown; wet; fine; little SILT.	S05	9.5	36-43-22	65	18	16										
					11						29	15.1							
			11.0', grades brown.	S06	11	8-16-41	57	18	13										
			Becomes less cemented. Cementation ends at 11.9'. Calcite seams end.		12.5														
			Poorly-graded SAND (SP); medium dense; grayish brown; wet; fine to medium; trace SILT; weak cementation.	S07	12.5	12-15-13	28	18	13										
			Calcite seams in the top 4".		14														
275.41	15		14.0', grades mostly medium-grained; subrounded; white calcite seams; primarily quartz and muscovite.	S08	14	6-7-10	17	18	14										
					15.5						2.8								

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0002R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 1 of 5	

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-12-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2158798.327 / E6322192.091 (National Grid)		HOLE ID S0002R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING		SURFACE ELEVATION 290.41 ft (NAVD88)
DRILLING METHOD AUGER(0'-5.5'), ROTARY(5.5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		Poorly graded SAND (SP); dense; grayish brown; wet; fine; few SILT; weak cementation.		S09	20	21-18-14	32	18	14	3.5	14.8							
						21.5													
265.41	25		SILTY SAND (SM); medium dense; grayish brown; wet; fine to coarse; little SILT; weak cementation.		S10	25	6-8-9	17	18	14	15.7								
						26.5													
260.41	30		SILTY SAND (SM); dense; olive brown; wet; fine; little SILT; weak cementation; frequent reddish brown oxidation partings.		S11	30	18-21-21	42	18	16	43.5 45.6	15							
						31.5													
255.41	35		SILT (ML); stiff to hard; olive brown; wet; fine; few SAND; low plasticity.		S12	35	16-24-36	60	18	17	86.4	28.6	32	3	2.2				
						36.5													
250.41	40																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0002R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 2 of 5

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-12-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2158798.327 / E6322192.091 (National Grid)		HOLE ID S0002R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING		SURFACE ELEVATION 290.41 ft (NAVD88)
DRILLING METHOD AUGER(0'-5.5'), ROTARY(5.5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	40		SANDY SILTY CLAY (CL-ML); very stiff to hard; brown; wet; some fine SAND; trace coarse SAND; low plasticity; slow dilatancy.	S13	40	12-13-24	37	18	16		52	16.5	22	7	2.1				PP: 2.5 tsf TV: 2.1 tsf
245.41	45		SILT with SAND (ML); hard; brown; wet; fine; little SAND; no plasticity; slow dilatancy; weak cementation; trace organics; frequent calcite seams; frequent reddish brown partings.	S14	45	15-22-25	47	18	17		81.7	29.2/27.9			2.4				Atterberg Limits: NP
240.41	50		SANDY SILT (ML); hard; olive brown; wet; fine; some SAND; weak cementation; frequent reddish brown pockets of oxidation.	S15	50	19-22-17	39	18	16		65.7	29.8							
235.41	55		Poorly-graded SAND (SP); very dense; olive brown; wet; fine; trace SILT; low dilatancy; weak cementation; frequent reddish brown staining.	S16	55	19-26-28	54	18	18										
230.41	60																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0002R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 3 of 5	

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-12-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2158798.327 / E6322192.091 (National Grid)		HOLE ID S0002R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING		SURFACE ELEVATION 290.41 ft (NAVD88)
DRILLING METHOD AUGER(0'-5.5'), ROTARY(5.5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 81.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
60					S17	60	17-50	50/5"	11	11									
			SILTY SAND (SM); very dense; reddish brown; wet; fine; some SILT; frequent interbedded layers of grayish brown SILT; no cementation.			61.5					49.3	12.5							
225.41	65				S18	65	21-50	50/5"	11	11									
			66.2', olive brown; some fine SAND; trace coarse SAND; weak cementation.			66.5													
220.41	70				S19	70	18-43-57	100	18	18									
			SILT with SAND (ML); hard; olive brown; wet; few coarse SAND; low plasticity; weak cementation.			71.5					82.4	31.7/30.5	31	7	3.3				
215.41	75				S20	75	14-18-21	39	18	18									
			Poorly-graded SAND (SP); dense; grayish brown; wet; fine; trace fines; rapid dilatancy; weak cementation.			76.5													
210.41	80																		

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0002R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 4 of 5	



PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-12-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2158798.327 / E6322192.091 (National Grid)		HOLE ID S0002R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING		SURFACE ELEVATION 290.41 ft (NAVD88)
DRILLING METHOD AUGER(0'-5.5'), ROTARY(5.5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
80			SANDY SILT (ML); hard; grayish brown; wet; some fine SAND.		S21	80	16-23-41	64	18	17	65.4								
						81.5													
Borehole terminated at a depth of 81.5' on 10/13/2011.																			
For corrosion test results, see Appendix E.																			
Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.																			
See Borehole Log Legend for soil classification chart and key to test data and sampler type.																			



REPORT TITLE BORING RECORD				HOLE ID S0002R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 5 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-12-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2157250.773 / E6323232.859 (National Grid)		HOLE ID S0003R
DRILLING CONTRACTOR/DRILLER Pitcher/O. Espinosa			IN-SITU TESTING Standpipe Piezometer		SURFACE ELEVATION 287.98 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-82')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 82 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		ASPHALT (5) (AC).	S01	0			60	60									Hand auger to 5.0'
			SILTY SAND (SM); brown; moist to dry; fine; subangular; trace GRAVEL; little SILT; weak to moderate cementation; [FILL].							24.1								Modified Proctor: Max γ_d = 136.7 pcf Optimum W_L = 6.4%
282.98	5		5.0' - 6.5', grades loose; weak cementation.	S02	5	3-3-3	6	18	18									Set-up for rotary drilling at 5.0' using 4.875" tricone bit
			6.5' - 7.2', grades to medium; wet.	S03	6.5	8-9-8	17	18	18									
			SILTY SAND (SM); brown; moist; fine; some SAND; weak cementation; [ALLUVIUM].		8													
			SILT (ML); very stiff; reddish brown; wet; fine; few SAND; weak cementation.	S04	8	34-50	50/6"	12	12	43.1/44.9/89.7								
			9.0', grades to reddish brown mottled with grayish brown.		9.5													
277.98	10		SANDY CLAY (CL); hard; grayish brown; wet; fine; some SAND; SILT; interbedded layers of SAND; medium plasticity; weak cementation.	S05	9.5	22-20-22	42	18	18	58.3	18.5	28	12	3				
			SANDY SILT (ML); hard; grayish brown; wet; fine; little SAND; low plasticity.	S06	11	29-39-50	89/11.5"	18	18	69.4	24.7	32	6	1.9				
					12.5													
				S07	12.5	17-9-9	18	18	17									
			Poorly graded SAND with SILT (SP-SM); medium dense; brown; wet; fine; few SILT; weak cementation.		14													
				S08	14	5-8-15	23	18	14	10.2								
272.98	15		14.7' - 15.5', grades to dark yellowish brown; medium.		15.5													

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0003R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 1 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-12-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2157250.773 / E6323232.859 (National Grid)		HOLE ID S0003R
DRILLING CONTRACTOR/DRILLER Pitcher/O. Espinosa			IN-SITU TESTING Standpipe Piezometer		SURFACE ELEVATION 287.98 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-82')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 82 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		SILT (ML); very stiff; grayish brown; wet; few fine SAND; low plasticity; weak cementation.		S09	20	5-10-6	16	18	13									
						21.5					91.2		24	1	1.3				
262.98	25		Poorly graded SAND with SILT (SP-SM); medium dense; brown and dark yellowish brown; wet; fine; few SILT; weak cementation.		S10	25	9-11-12	23	18	17									
						26.5					8.7								
257.98	30		30'-31' grades fine to coarse; subrounded.		S11	30	15-15-22	37	18	11									
						31.5					6.5								
252.98	35		CLAYEY SILT (CL-ML); hard; grayish brown with reddish brown mottling; wet; fine; little SAND; low plasticity.		S12	35	33-45-48	93	18	14									
						36.5					88.3	23.8	28	6	2.3				
247.98	40																		

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0003R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 2 of 5	



PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-12-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2157250.773 / E6323232.859 (National Grid)		HOLE ID S0003R
DRILLING CONTRACTOR/DRILLER Pitcher/O. Espinosa			IN-SITU TESTING Standpipe Piezometer		SURFACE ELEVATION 287.98 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-82')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 82 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	40		SANDY SILTY CLAY (CL-ML); hard; grayish brown with frequent reddish brown mottling; wet; low plasticity; weak to moderate cementation.	S13	40	41.5	19-20-22	42	18	18	53.6	15.5	17	4	2.3				
242.98	45		Poorly graded SAND (SP); very dense; grayish brown with layers of brown; wet; fine; trace fine SILT; weak to moderate cementation.	S14	45	46.5	15-21-42	63	18	18									
237.98	50		Poorly graded SAND with SILT (SP-SM); very dense; grayish brown to dark yellowish brown.	S15	50	51.5	31-26-33	59	18	10	11.5								
232.98	55		SILT (ML); hard; grayish brown with reddish mottling; wet; fine; trace organics; low plasticity.	S16	55	56.5	35-39-50	89	18	16	85.7		22	3	1.9				
227.98	60																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0003R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 3 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-12-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2157250.773 / E6323232.859 (National Grid)		HOLE ID S0003R
DRILLING CONTRACTOR/DRILLER Pitcher/O. Espinosa			IN-SITU TESTING Standpipe Piezometer		SURFACE ELEVATION 287.98 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-82')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 82 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
60			SILTY CLAY (CL-ML); hard; grayish brown with red brown mottling; wet; some fine SAND; low plasticity. 60.7', grades to reddish brown.		S17	60	44-32-37	69	18	18									
						61.5					50.7	18.6	21	5	3.4				
222.98	65		65.0', SAND grades coarse.		S18	65	33-50	50/ 6"	12	12									
						66.5													
217.98	70		SILTY SAND (SM); very dense; grayish brown with brown mottling; wet; fine; some SILT.		S19	70	31-38-50	88/ 12"	18	18									
						71.5					41.7								
212.98	75		SILT (ML); hard; grayish brown with reddish brown mottling; wet; few fine SAND; no plasticity. 76.0', grades to grayish brown.		S20	75	29-31-50	81/ 11"	17	16									
						76.5					91.6	29.5			1.8				Atterberg Limits: NP
207.98	80																		

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0003R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 4 of 5



PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-12-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2157250.773 / E6323232.859 (National Grid)		HOLE ID S0003R
DRILLING CONTRACTOR/DRILLER Pitcher/O. Espinosa			IN-SITU TESTING Standpipe Piezometer		SURFACE ELEVATION 287.98 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-82')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 82 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
80				X	S21	80	50	50/	18	6									
						81.5													
			<p>Borehole terminated at a depth of 82.0' on 10/12/2011. Reamed out hole with 5.875" tricone bit to install piezometer. Installed standpipe piezometer on 10/13/2011.</p> <p>For corrosion test results, see Appendix E.</p> <p>Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.</p> <p>See Borehole Log Legend for soil classification chart and key to test data and sampler type.</p>																
202.98	85																		
197.98	90																		
192.98	95																		
187.98	100																		



REPORT TITLE BORING RECORD				HOLE ID S0003R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 5 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2156592.751 / E6324256.277 (National Grid)		HOLE ID S0004R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING		SURFACE ELEVATION 283.69 ft (NAVD88)
DRILLING METHOD AUGER(0'-15.5'), ROTARY(15.5'-81.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 3.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		CONCRETE (12") (CR).		S01	0			60	60									Hand auger/garbage barrel to 5.0'
			SILT (ML); reddish brown and brown; moist to dry; fine to medium SAND; weak cementation; [FILL].								51.8								Modified Proctor: Max $\gamma_d = 121$ pcf Optimum $W_L = 12.2\%$
278.69	5		5.0' Grades to brown.		S02	5	7-33-42	75	18	18									
			SILTY SAND (SM); very dense; reddish brown with reddish layers; moist to dry; fine to medium SAND; [ALLUVIUM].			6.5													
			SANDY SILT (ML); hard; reddish brown with brown layers; moist to dry; trace fine GRAVEL; fine to medium SAND; low plasticity.		S03	6.5	20-41-50	91/10"	16	16									
						8					59.9	25.2	27	1	3.1				
			SILTY SAND (SM); hard; brown; moist to dry; little SILT.		S04	8	13-16-14	30	18	16									
						9.5					24								
273.69	10		9.1', grades to grayish brown.		S05	9.5	11-23-40	63	18	18									
			SANDY CLAY (CL); hard; grayish brown; dry; some fine SAND; trace medium to coarse SAND; low plasticity; weak cementation.			11					55.8	18.4	25	8	2.6				
			Poorly graded SAND with SILT (SP-SM); very dense; brown; moist to dry; few SILT; fine to medium SAND; trace coarse SAND; weak cementation.		S06	11	25-27-39	66	18	18									
			11.0', grades to grayish brown with reddish brown mottling.			12.5					52.1	10.3	17	2	1.7				
			SANDY SILT (ML); hard; reddish brown with reddish mottling; moist to dry; some SAND; low plasticity; weak cementation.		S07	12.5	11-12-10	22	18	13									
						14					65.4	12.8	19	4	2				
			SANDY SILTY CLAY (CL-ML); very stiff; grayish brown; moist to dry; some fine SAND; trace medium to coarse SAND; low plasticity; weak cementation.		S08	14	8-8-10	18	18	18									
268.69	15		13.1', grades to brown with occasional dark brown mottling; fine to medium SAND.			15.5					65.5	16.1	19	2	1.4				
			SANDY SILT (ML); very stiff; grayish brown; moist; some fine SAND; weak cementation.																

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0004R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 1 of 5



PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2156592.751 / E6324256.277 (National Grid)	
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING	
DRILLING METHOD AUGER(0'-15.5'), ROTARY(15.5'-81.5')			DRILL RIG Failing 1500	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop	
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER DURING DRILLING READINGS	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 81.5 ft	

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		SILT (ML); hard; grayish brown with frequent reddish brown mottling; moist to wet; few SAND.		S09	20	9-13-12	25	18	18	89.8								
						21.5													
258.69	25		SILTY SAND (SM); dense; reddish brown; wet; little SILT; fine to medium SAND; weak cementation.		S10	25	9-16-26	42	18	10	79	19.2							
			SILT (ML); hard; grayish brown with reddish brown mottling; wet; some fine SAND.			26.5													
253.69	30		SILTY SAND (SM); dense; brown; wet; some SILT; weak cementation.		S11	30	18-20-16	36	18	17	28.4								
			30.9' SILT lens; brown with reddish brown mottling; fine to medium SAND.			31.5					82.8								
248.69	35		35.0', grades to very dense; reddish brown.		S12	35	11-23-41	64	18	16	32.1								
						36.5													
243.69	40																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0004R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 2 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2156592.751 / E6324256.277 (National Grid)		HOLE ID S0004R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING		SURFACE ELEVATION 283.69 ft (NAVD88)
DRILLING METHOD AUGER(0'-15.5'), ROTARY(15.5'-81.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 3.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 81.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	40		SANDY SILT (ML); hard; grayish brown; wet; fine; some SAND.		S13	40	9-17-19	36	18	12	63.4								
						41.5													
238.69	45		SANDY SILTY CLAY (CL-ML); hard; grayish brown with reddish brown mottling; wet; trace medium to coarse SAND; low plasticity; weak cementation.		S14	45	24-50	50/5.5"	12	10	60.5	20.2	22	5	2.3				
						46.5													
233.69	50		50.0', grades to grayish brown.		S15	50	50	50/5"	5	4									
						51.5													
			51.5', grades to grayish brown with reddish mottling.		S16	51.5	17-23-27	50	18	13									
						53													
			SILT (ML); hard; grayish brown with reddish brown; wet; trace fine SAND; weak cementation.		S17	53	18-29-40	69	18	16									
						54.5													
228.69	55		SILT with SAND (ML); hard; grayish brown with reddish brown mottling; wet; little fine to medium SAND; medium plasticity; weak cementation.		S18	54.5	31-45-50	95/9"	15	15	96.9	30.1							
						56					82.9	35.7	39	10					

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0004R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 3 of 5	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2156592.751 / E6324256.277 (National Grid)		HOLE ID S0004R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING		SURFACE ELEVATION 283.69 ft (NAVD88)
DRILLING METHOD AUGER(0'-15.5'), ROTARY(15.5'-81.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 3.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 81.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	60		Poorly graded SAND with SILT (SP-SM); very dense; grayish brown with reddish brown mottling; wet; few SILT; medium SAND; trace subangular GRAVEL; weak cementation.		S19	60	32-50	50/ 3"	12	8									
						61.5													
218.69	65		Poorly graded SAND (SP); very dense; brown; wet; trace SILT; fine to medium SAND; weak cementation. SANDY SILTY CLAY (CL-ML); hard; grayish brown; wet; little fine SAND; trace medium SAND; low plasticity; weak cementation.		S20	65	33-30-26	56	18	16									
						66.5					67.3	24.6	26	7	2.1				
213.69	70		SANDY SILT (ML); hard; grayish brown; wet; some fine SAND.		S21	70	32-50	50/ 5"	11	11									
						71.5					55.5	31.5/ 30.5	33	8	2.3				
208.69	75		Poorly graded SAND (SP); dense; brown; wet; trace SILT; medium SAND; weak cementation.		S22	75	29-22-16	38	18	13									
						76.5													
203.69	80																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0004R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 4 of 5	

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2156592.751 / E6324256.277 (National Grid)		HOLE ID S0004R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING		SURFACE ELEVATION 283.69 ft (NAVD88)
DRILLING METHOD AUGER(0'-15.5'), ROTARY(15.5'-81.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 3.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
80			80.0', grades to grayish brown; fine to medium SAND.		S23	80	11-21-18	39	18	14									
			80.6', grades to fine SAND.			81.5													
<p>Borehole terminated at a depth of 81.5' on 10/24/2011.</p> <p>For corrosion test results, see Appendix E.</p> <p>Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.</p> <p>See Borehole Log Legend for soil classification chart and key to test data and sampler type.</p>																			



REPORT TITLE BORING RECORD				HOLE ID S0004R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 5 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-13-11	COMPLETION DATE Oct-14-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2155457.493 / E6325238.589 (National Grid)		HOLE ID S0005R
DRILLING CONTRACTOR/DRILLER Pitcher/Oscar			IN-SITU TESTING Standpipe Piezometer; PS Logging		SURFACE ELEVATION 285.26 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-82')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION N/A			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 82 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		ASPHALT (7") (AC).		S01	0			60	60									Hand auger to 5.0'
			Poorly graded SAND with SILT (SP-SM); brown; dry; fine; subangular; trace SILT; trace coarse SAND; weak cementation; [FILL].			5													Modified Proctor: Max γ_d = 133.9 pcf Optimum W_L = 6%
280.26	5				S02	5	5-5-49	54	18	18									Set up mud rotary at 5.0' using 4.875" tricone bit; casing at 5.0'
			Poorly graded SAND with SILT (SP-SM); very dense; reddish brown; dry; fine; few SILT; trace coarse SAND; weak to moderate cementation; [ALLUVIUM].		S03	6.5	50	50/3.5"	4	4	13.8								7.0', driller notes hard material
			8' grades to brown.		S04	8	50	50/6"	6	6									
						9.5													
275.26	10		SANDY SILT (ML); hard; reddish brown with grayish brown mottling; moist; fine; trace organics; some fine SAND; low plasticity.		S05	9.5	17-34-37	71	18	14									
						11					59.7	21.1	26	4	1.9				
			SANDY SILT (ML); reddish brown with grayish mottling; moist; fine; trace organics; some fine SAND; low plasticity.		S06	11	9-23-22	45	18	14									
						12.5					57.6	21.8	23	3	1.5				
			SANDY SILTY CLAY (CL-ML); brown with reddish mottling; wet.		S07	12.5	21-42-50	92/10.5"	17	13									
						14					67.7	18.4	23	5	2.1				
			SANDY SILT (ML); brown.		S08	14	28-50	50/5"	18	10									
270.26	15					15.5					54.7								15.0', ends continuous sampling

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0005R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 1 of 5	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-13-11	COMPLETION DATE Oct-14-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2155457.493 / E6325238.589 (National Grid)		HOLE ID S0005R
DRILLING CONTRACTOR/DRILLER Pitcher/Oscar			IN-SITU TESTING Standpipe Piezometer; PS Logging		SURFACE ELEVATION 285.26 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-82')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION N/A			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 82 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		SILTY SAND (SM); dense; mottled dark reddish brown with grayish brown; wet; fine; little SILT; weak cementation.	X	S09	20	11-13-19	32	18	10	17.5								
						21.5													
260.26	25		SILT (ML); very stiff; mottled dark grayish brown with reddish brown; wet; few SAND.	X	S10	25	10-11-13	24	18	10	91.9								
						26.5													
255.26	30		SILTY CLAY with SAND (CL-ML); hard; grayish brown with reddish brown mottling; wet; fine; trace organics; some SAND; low plasticity.	X	S11	30	12-17-22	39	18	18	74.4	17	25	7	2.7				
						31.5													
250.26	35		Poorly graded SAND with SILT (SP-SM); very dense; grayish brown with dark yellowish brown mottling; wet; fine to medium; few SILT; weak cementation.	X	S12	35	26-42-50	92/11.5"	18	14	7.3								
						36.5													
245.26	40																		

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0005R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 2 of 5	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-13-11	COMPLETION DATE Oct-14-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2155457.493 / E6325238.589 (National Grid)		HOLE ID S0005R
DRILLING CONTRACTOR/DRILLER Pitcher/Oscar			IN-SITU TESTING Standpipe Piezometer; PS Logging		SURFACE ELEVATION 285.26 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-82')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION N/A			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 82 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	40		SANDY SILT (ML); hard; brown with reddish brown mottling with seams of grayish brown; wet; little organics; some coarse SAND; low plasticity; weak cementation.		S13	40	30-36-50	86/11"	17	17									
						41.5					59.5	24.3	33	6	5.1				
240.26	45		SILT with SAND (ML); hard; grayish brown with reddish brown mottling; wet; trace organics; low plasticity.		S14	45	21-50	50/4.5"	11	11									
						46.5					79.7	33.1	36	9	3.5				
			SANDY SILT (ML); hard; grayish brown with reddish brown mottling; wet.		S15	46.5	30-50	50/5.5"	12	12									
						48					56.6/62.3				0				
					S16	48	18-26-25	51	18	16									
						49.5													
235.26	50		SANDY SILTY CLAY (CL-ML); hard; brown with reddish brown mottling; wet; some SAND; low plasticity.		S17	49.5	27-37-37	74	18	15									
						51					64.5	19.8	24	4	1.8				
230.26	55		Poorly graded SAND with SILT (SP-SM); very dense; brown; wet; fine; few SILT; weak cementation.		S18	55	20-27-31	58	18	16									
						56.5					9								
225.26	60																		

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0005R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 3 of 5

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-13-11	COMPLETION DATE Oct-14-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2155457.493 / E6325238.589 (National Grid)		HOLE ID S0005R
DRILLING CONTRACTOR/DRILLER Pitcher/Oscar			IN-SITU TESTING Standpipe Piezometer; PS Logging		SURFACE ELEVATION 285.26 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-82')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION N/A			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 82 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
60					S19	60	16-18-21	39	18	16									
						61.5													
220.26	65		65.0', grades to reddish brown; fine to medium SAND.		S20	65	50	50/ 5.5"	6	6									
						66.5													
215.26	70		SILTY SAND (SM); very dense; reddish brown with yellowish brown; wet; fine; some SILT; weak cementation.		S21	70	24-27-31	58	18	15									
						71.5													
											16 38.2								
210.26	75		Poorly graded SAND (SP); very dense; yellowish brown; wet; medium.		S22	75	17-25-30	55	18	14									
						76.5													
205.26	80																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0005R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 4 of 5	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-13-11	COMPLETION DATE Oct-14-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2155457.493 / E6325238.589 (National Grid)		HOLE ID S0005R
DRILLING CONTRACTOR/DRILLER Pitcher/Oscar			IN-SITU TESTING Standpipe Piezometer; PS Logging		SURFACE ELEVATION 285.26 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-82')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION N/A			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 82 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
80			SILT with SAND (ML); hard; brown with reddish brown mottling; wet; some fine SAND; weak cementation.	X	S23	80	50	50/ 5"	5	5	74.9								
						81.5													
			<p>Borehole terminated at a depth of 82.0' on 10/14/2011. Overdrilled hole to 95.0' for PS Logging.</p> <p>For corrosion test results, see Appendix E.</p> <p>Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.</p> <p>See Borehole Log Legend for soil classification chart and key to test data and sampler type.</p>																
200.26	85																		
195.26	90																		
190.26	95																		
185.26	100																		



REPORT TITLE BORING RECORD				HOLE ID S0005R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 5 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-13-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2154688.474 / E6325497.455 (National Grid)		HOLE ID S0006R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING		SURFACE ELEVATION 287.64 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method Casing Depth	Remarks/ Other Tests
	0		ASPHALT (8") (AC).	S01	0			60	60								Hand auger to 5.0'
			AGGREGATE BASE (8") (AB).														
			Poorly graded SAND with SILT (SP-SM); loose; brown; moist; medium; subrounded; rapid dilatancy; [FILL].							13.9							
	5			S02	5	2-3-4	7	18	18								
					6.5												
			SILTY SAND (SM); very dense; reddish brown; wet; medium; subrounded; little SILT; slow dilatancy; few calcite seams [ALLUVIUM].	S03	6.5	22-50-51	101	18	18								
					8												
				S04	8	16-25-24	49	18	16								
					9.5					43.8							
	10		Grades medium dense; no calcite seams; some SILT.	S05	9.5	14-13-10	23	18	15								
					11												
				S06	11	7-7-7	14	18	16								
					12.5												
			Grades dense.	S07	12.5	7-17-27	44	18	15								
			13.25'; dense; olive brown and reddish brown; fine; few calcite streaks.		14												
			SANDY SILT (ML); hard; brown to reddish brown; wet; slow dilatancy; calcite seams.	S08	14	10-16-15	31	18	14								
					15.5					68.2	21.9						

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0006R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 1 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-13-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2154688.474 / E6325497.455 (National Grid)		HOLE ID S0006R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING		SURFACE ELEVATION 287.64 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
TOTAL DEPTH OF BORING 81.5 ft					

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		SILT with SAND (ML); stiff; brown; wet; little fine SAND; slow dilatancy.		S09	20	3-4-6	10	18	13									
						21.5					75.2								
262.64	25		25' grades to hard; rapid dilatancy; reddish oxidized parting; little medium to coarse SAND.		S10	25	18-24-51	75	18	15									
						26.5					77.4	22.8							
257.64	30		SILTY SAND (SM); dense; grayish brown; wet; fine to medium; interbedded with SILT; rapid dilatancy.		S11	30	13-15-16	31	18	17									
						31.5					20.7								
252.64	35		Poorly graded SAND (SP); medium dense; brown; wet; medium; subrounded; trace fines; rapid dilatancy.		S12	35	6-13-15	28	18	15									
						36.5													
			SANDY SILT (ML); very stiff; brown; wet; fine; slow dilatancy.		S13	36.5	10-15-19	34	18	18									
						38					71.5	25.8							
			SILTY SAND (SM); medium dense; reddish brown; wet; fine to medium; some SILT; rapid dilatancy.		S14	38	11-12-11	23	18	17									
						39.5					32.6/32.7	15.3							
247.64	40		SILTY SAND (SM); dense; reddish brown; wet; fine to		S15	39.5	9-13-19	32	18	15									

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0006R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 2 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-13-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2154688.474 / E6325497.455 (National Grid)	
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING	
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop	
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER DURING DRILLING READINGS	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 81.5 ft	

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
40			medium; subangular to subrounded; trace GRAVEL; slow dilatancy; moderate cementation.			41					39.5	11.2							
242.64	45		Poorly graded SAND with SILT (SP-SM); medium dense; reddish brown; wet; medium; subangular to subrounded; little SILT; few GRAVEL; slow dilatancy; moderate cementation.		S16	45	8-12-14	26	18	13	10.6								
						46.5													
237.64	50		50.0', grayish brown; wet; fine to medium; subrounded; few GRAVEL; rapid dilatancy.		S17	50	11-13-13	26	18	14	6.4	14.2							
						51.5													
232.64	55		55.0', very dense; brown; wet; medium; subrounded; few fines; slow dilatancy.		S18	55	12-21-32	53	18	18									
						56.5													
227.64	60																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0006R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 3 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-13-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2154688.474 / E6325497.455 (National Grid)		HOLE ID S0006R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING		SURFACE ELEVATION 287.64 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
TOTAL DEPTH OF BORING 81.5 ft					

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
60			Poorly graded SAND (SP); very dense; brown; wet; medium; subrounded; rapid dilatancy.	X	S19	60	45-75-63	138	18	13									
			SILTY SAND (SM); very dense; brown; fine; little SILT; slow dilatancy.			61.5													
222.64	65		65.0', reddish brown; fine to medium; subrounded; little fines.	X	S20	65	26-34-34	68	18	13									
						66.5													
217.64	70		70.0', medium; red horizontal partings.	X	S21	70	24-47-50	97	18	13									
						71.5													Red bedding 1/4 thick (horizontal bedding experienced at 70.67' to 70.75'; three well defined red hematite oxidation zones
212.64	75		SILT with SAND (ML); hard; brown; wet; subrounded to subangular; some fine SAND; low plasticity; medium dry strength; no dilatancy; low toughness.	X	S22	75	26-50	50/3"	9	9									
						76.5													PP: 1.0 tsf
207.64	80																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0006R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 4 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-13-11	COMPLETION DATE Oct-13-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2154688.474 / E6325497.455 (National Grid)		
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING		
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			TOTAL DEPTH OF BORING 81.5 ft		
			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS Not Recorded Not Recorded		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
80			Grades red to brownish red.	X	S23	80	13-19-16	35	18	8									
			Poorly graded SAND (SP); dense; grayish brown; wet; medium.			81.5													
			Borehole terminated at a depth of 81.5' on 10/13/2011.																
			For corrosion test results, see Appendix E.																
			Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.																
			See Borehole Log Legend for soil classification chart and key to test data and sampler type.																
202.64	85																		
197.64	90																		
192.64	95																		
187.64	100																		



REPORT TITLE BORING RECORD				HOLE ID S0006R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 5 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-14-11	COMPLETION DATE Oct-14-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2152086.945 / E6327473.995 (National Grid)		HOLE ID S0007R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING		SURFACE ELEVATION 285.11 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method Casing Depth	Remarks/ Other Tests
	0		ASPHALT (6") (AC).	S01	0			60	60								Hand auger to 5.0' to confirm no utilities
			AGGREGATE BASE (6") (AB).														
			SILTY SAND (SM); medium dense; brown; moist; medium; subrounded; few fine GRAVEL; rapid dilatancy; no cementation; [FILL].							30.8							
280.11	5		Poorly graded SAND with SILT (SP-SM); very dense; brown to reddish brown; wet; fine; little SILT; few coarse SAND; slow dilatancy; moderate cementation; calcite layers 1/2 to 3/4" thick [ALLUVIUM].	S02	5	52-96-50	146/9"	15	15								
			5.0' - 6.3', calcite seams.		6.5					32.6	10.3						
			7.0', grades dense; without calcite; weak cementation.	S03	6.5	21-42-70	112	18	17								
					8					37.2	11.1						
				S04	8	23-31-18	49	18	17								
					9.5												
275.11	10		9.5', grades medium dense.	S05	9.5	6-7-10	17	18	13	30.9	13.6						
			11.0', grades dense; frequent calcite seams.		11												
			12.2' - 14.0', calcite seams.	S06	11	8-21-19	40	18	13								
					12.5												
				S07	12.5	7-10-21	31	18	14								
					14					30.4	19.9						
270.11	15		14.0', grades very dense.	S08	14	17-37-34	71	18	15	40.7	14.1						
					15.5												

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0007R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 1 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-14-11	COMPLETION DATE Oct-14-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2152086.945 / E6327473.995 (National Grid)	
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			HOLE ID S0007R	
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			SURFACE ELEVATION 285.11 ft (NAVD88)	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			BOREHOLE DIAMETER 3.75 in	
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			HAMMER EFFICIENCY, ERI 88%	
			TOTAL DEPTH OF BORING 81.5 ft	
			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS Not Recorded Not Recorded	

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
20			SILTY SAND (SM); medium dense; grayish brown; fine to medium; rounded to subrounded; few SILT; rapid dilatancy; weak cementation.		S09	20	5-7-8	15	18	13	7.4								
			21.5', some SILT.			21.5					30.4								
260.11	25		25.0', grades dense.		S10	25	18-13-17	30	18	14									
						26.5													
			SILTY SAND (SM); dense; olive brown; wet; fine; some SILT; slow dilatancy.																
255.11	30		SILT with SAND (ML); hard; olive brown; wet; little SAND; slow dilatancy.		S11	30	7-11-30	41	18	17	84.2	29.7							
			SILTY SAND (SM); dense; brown; wet; fine to medium; subrounded; some SILT; slow dilatancy; reddish brown oxidation seams.			31.5					43.9	14.1							
250.11	35		35.0', brown to reddish brown; fine SAND; weak cementation.		S12	35	12-12-15	27	18	14									
						36.5					30.5								

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0007R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 2 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-14-11	COMPLETION DATE Oct-14-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2152086.945 / E6327473.995 (National Grid)		HOLE ID S0007R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING		SURFACE ELEVATION 285.11 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
40					S13	40	8-16-24	40	18	17									PP: 3.25 tsf TV: 5.0 tsf
			SILTY CLAY with SAND (CL); hard; reddish brown; wet; some SILT; some SAND; medium plasticity; medium dry strength; low toughness.			41.5					74.8	17.8	41	26					
240.11	45				S14	45	8-12-17	29	18	15									PP: 1.5 tsf TV: 2.0 tsf
			SANDY SILT (ML); very stiff; reddish brown and grayish brown; some fine SAND; weak cementation.			46.5					68.2	28.6							
235.11	50				S15	50	9-12-12	24	18	18									
			SILTY SAND (SM); medium dense; brown; wet; fine to medium; subangular; some SILT; weak cementation.			51.5					17.6								
230.11	55				S16	55	5-7-11	18	18	18									
			SANDY SILT (ML); very stiff; light brown; wet; some fine SAND; slow dilatancy; weak cementation.			56.5					59.5								
225.11	60																		

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0007R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 3 of 5



PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-14-11	COMPLETION DATE Oct-14-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2152086.945 / E6327473.995 (National Grid)		HOLE ID S0007R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING		SURFACE ELEVATION 285.11 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
60			SILTY SAND (SM); dense; brown; wet; fine; some SILT; stratified with interbedding of SILT; no dilatancy; weak cementation.		S17	60	18-14-24	38	18	18									
						61.5					41	17.5							
220.11	65		SANDY SILT (ML); hard; reddish brown; wet; subangular; some SAND; trace fine GRAVEL; mottled hematite staining.		S18	65	13-20-28	48	18	18									
						66.5					50.1	17.9							
215.11	70				S19	70	6-14-25	39	18	18									
						71.5													
210.11	75		75.0' brown; reddish brown subhorizontal seams of oxidation staining; no dilatancy; weak cementation.		S20	75	16-20-50	70	18	14									
						76.5					51.5	22.4							
205.11	80																		

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0007R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 4 of 5	



PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-14-11	COMPLETION DATE Oct-14-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2152086.945 / E6327473.995 (National Grid)		HOLE ID S0007R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING		SURFACE ELEVATION 285.11 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 81.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
80			SILT with SAND (ML); hard; light olive brown; wet; fine; frequent dark reddish brown seams; weak cementation.	X	S21	80	29-50-67	117	18	13									
						81.5					77.3	29.3							
<p>Borehole terminated at a depth of 81.5' on 10/14/2011.</p> <p>For corrosion test results, see Appendix E.</p> <p>Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.</p> <p>See Borehole Log Legend for soil classification chart and key to test data and sampler type.</p>																			



REPORT TITLE BORING RECORD				HOLE ID S0007R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 5 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-17-11	COMPLETION DATE Oct-19-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2150921.784 / E6328341.737 (National Grid)		HOLE ID S0010R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING Standpipe Piezometer; PS Logging		SURFACE ELEVATION 286.12 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 165 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method Casing Depth	Remarks/ Other Tests
	0		ASPHALT (8") (AC).	S01	0			60	60								Hand auger to 5.0'
			AGGREGATE BASE (4") (AB).														
			SILTY SAND (SM); brown; moist; fine to medium; rapid dilatancy; [FILL].							22.3							
281.12	5			S02	5	5-7-11	18	18	18								
			SILTY SAND (SM); medium dense; brown; moist; fine to medium; [ALLUVIUM].		6.5					24.4	4.8						
			SANDY SILT (ML); hard; grayish brown; wet; fine; low plasticity; slow dilatancy; weak cementation. Grades wet.	S03	6.5	10-21-27	48	18	17								
					8												
				S04	8	10-19-24	43	18	17								
					9.5					57	15.9						
276.12	10		SANDY SILTY CLAY (CL-ML); hard; brown; wet; low plasticity; slow dilatancy.	S05	9.5	14-20-24	44	18	17								
					11					52.9		27	5	3.2			
			SILTY SAND (SM); medium dense; brown; wet; fine; some SILT.	S06	11	5-7-10	17	18	17								
					12.5					41.7	16.4						
			SANDY SILTY CLAY (CL-ML); hard; grayish brown; wet; fine SAND; low plasticity; fine; mottled grayish brown and brown.	S07	12.5	14-25-24	49	18	15								
					14					58.9/15.2		29	7	1.5			
271.12	15		14.0', grades brownish gray.	S08	14	10-13-16	29	18	15								
					15.5												

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0010R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 1 of 9	



PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-17-11	COMPLETION DATE Oct-19-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2150921.784 / E6328341.737 (National Grid)		HOLE ID S0010R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING Standpipe Piezometer; PS Logging		SURFACE ELEVATION 286.12 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		SILTY SAND (SM); medium dense; grayish brown and brown; wet; medium; subrounded; trace GRAVEL; slow dilatancy; stratified; interbedded reddish brown oxidation stained pockets.		S09	20	9-11-13	24	18	16									
						21.5					36.5 57.1	16.9							
261.12	25		SILT (ML); very stiff; grayish brown; wet; trace SAND; medium plasticity; medium dry strength; low toughness.		S10	25	11-15-18	33	18	18									
						26.5					94.6	30.8	35	10					
256.12	30		SILTY SAND (SM); medium dense; brownish gray; wet; fine to medium; subrounded; rapid dilatancy; primarily quartz, muscovite, and trace mafic minerals.		S11	30	7-9-10	19	18	16									
						31.5					23.7	20.9							
251.12	35				S12	35	9-10-11	21	18	17									
						36.5					22.7 15.2	17.4							
246.12	40																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0010R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 2 of 9

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-17-11	COMPLETION DATE Oct-19-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2150921.784 / E6328341.737 (National Grid)		HOLE ID S0010R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING Standpipe Piezometer; PS Logging		SURFACE ELEVATION 286.12 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
40			Poorly graded SAND with SILT (SP-SM); dense; reddish brown; wet; medium; subrounded; trace gravel; slow dilatancy.	S13	40	13-19-17	36	18	17		6.7								
241.12	45		SANDY CLAY (CL); hard; reddish brown; wet; fine; trace organic; medium plasticity; slow dilatancy.	S14	45	11-20-25	45	18	16		50.3	15.2 15.7	24	10	3.1				
236.12	50		CLAY with SAND (CL); hard; grayish brown; wet; fine; trace organic; low plasticity; slow dilatancy.	S15	50	13-16-19	35	18	16		75.1		30	9	1.5				
231.12	55		55.0', brownish gray; medium plasticity; medium dry strength; medium toughness; frequent reddish brown oxidation.	S16	55	8-13-23	36	18	18		78.3	31.7	41	17					PP: 1.0 tsf TV: 2.5 tsf
226.12	60																		

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0010R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 3 of 9

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-17-11	COMPLETION DATE Oct-19-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2150921.784 / E6328341.737 (National Grid)		HOLE ID S0010R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING Standpipe Piezometer; PS Logging		SURFACE ELEVATION 286.12 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 165 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	60		SANDY CLAY (CL); very stiff; olive brown; wet; fine; low plasticity; rapid dilatancy.		S17	60	6-11-14	25	18	16									
						61.5					64.5	23	25	8	1.9				
221.12	65		65 reddish brown; medium; subrounded; stratified to laminated; medium plasticity; medium dry strength; slow dilatancy; low toughness.		S18	65	9-10-13	23	18	17									
						66.5					63.5	21.7	43	26	5.8				
216.12	70		70.0', grades hard.		S19	70	13-17-18	35	18	15									
						71.5													
211.12	75		SILTY SAND (SM); dense; light brown; wet; fine to medium; interbedded with SILT; hard, brownish gray, wet; low plasticity; low dry strength; low toughness.		S20	75	18-24-24	48	18	15									
						76.5													
206.12	80																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0010R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 4 of 9	

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-17-11	COMPLETION DATE Oct-19-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2150921.784 / E6328341.737 (National Grid)		HOLE ID S0010R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING Standpipe Piezometer; PS Logging		SURFACE ELEVATION 286.12 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
80			SANDY SILT (ML); hard; light gray brownish gray; wet; fine; subrounded; low plasticity; rapid dilatancy; mottled reddish oxidation staining.		S21	80	19-23-30	53	18	18									
						81.5					58	28.4	25	2	1.8				
201.12	85		SILT with SAND (ML); very dense; brownish gray; wet; fine; low plasticity.		S22	85	8-24-34	58	18	17									
						86.5					74.5	31.3	27	1	1.6				
196.12	90		SANDY SILT (ML); dense; brownish gray; wet; fine.		S23	90	10-16-27	43	18	15									
						91.5					66.5								
191.12	95		SILTY SAND (SM); dense; brownish gray; wet; fine; little SILT; trace GRAVEL. 95.8' - 95.9', gravel seam.		S24	95	13-18-21	39	18	16									
						96.5													
186.12	100																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0010R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 5 of 9

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-17-11	COMPLETION DATE Oct-19-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2150921.784 / E6328341.737 (National Grid)		HOLE ID S0010R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING Standpipe Piezometer; PS Logging		SURFACE ELEVATION 286.12 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
100			Poorly graded SAND with SILT (SP-SM); medium dense; gray; wet; medium; subrounded; trace SILT.		S25	100	15-19-16	35	18	15									
						101.5					13.9	18.9							
181.12	105		SILT with SAND (ML); hard; grayish brown; wet; low plasticity; low dry strength; slow dilatancy; low toughness.		S26	105	25-33-59	92	18	17									
						106.5					77.1								
176.12	110		SILTY SAND (SM); dense; brown to dark brown; wet; fine; subangular; little SILT; trace coarse SAND; slow dilatancy.		S27	110	15-21-22	43	18	18									
						111.5					31.9								
171.12	115		115.0', grades medium dense; brown.		S28	115	11-15-20	35	18	18									
						116.5													

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0010R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 6 of 9

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-17-11	COMPLETION DATE Oct-19-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2150921.784 / E6328341.737 (National Grid)		HOLE ID S0010R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING Standpipe Piezometer; PS Logging		SURFACE ELEVATION 286.12 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
120			SAND with SILT (SP-SM); very dense; grayish brown; wet; fine; few fines; variegated with dark brown coloring; reddish brown oxidation staining.	S29	120	120	15-22-35	57	18	16									
						121.5													
161.12	125		SILT with SAND (ML); hard; brownish gray; wet; low plasticity; medium dry strength; low toughness; variegated with brown partings.	S30	125	125	38-68-50	118/8"	14	14									
						126.5						70	36.9	44	12				
156.12	130		SILTY SAND (SM); very dense; brownish gray; wet; fine.	S31	130	130	20-28-27	55	18	18									
						131.5						46.3							
151.12	135		Poorly graded SAND (SP); very dense; light grayish brown; wet; fine; trace fines; rapid dilatancy.	S32	135	135	25-34-47	81	18	18									
						136.5													

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0010R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 7 of 9

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-17-11	COMPLETION DATE Oct-19-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2150921.784 / E6328341.737 (National Grid)		HOLE ID S0010R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING Standpipe Piezometer; PS Logging		SURFACE ELEVATION 286.12 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 165 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
140			CLAYEY SAND (SC); very dense; brownish gray; wet; fine; little CLAY; no dilatancy; variegated dark yellowish brown parting oxidations.	S33	140	140	37-48-50	98/9	15	15									
						141.5													
141.12	145		Poorly graded SAND (SP); dense; light olive brown; wet; medium; subrounded.	S34	145	145	15-15-17	32	18	17									
						146.5													
136.12	150		SILTY SAND (SM); very dense; light brown; wet; fine; some SILT; slow dilatancy.	S35	150	150	17-32-36	68	18	18									
						151.5					30.8	36.8							
131.12	155																		
126.12	160																		Created a rat hole down to 165.0'

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0010R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 8 of 9	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-17-11	COMPLETION DATE Oct-19-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2150921.784 / E6328341.737 (National Grid)	
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING Standpipe Piezometer; PS Logging	
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop	
BOREHOLE BACKFILL AND COMPLETION Piezometer			TOTAL DEPTH OF BORING 165 ft	
			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS Not Recorded Not Recorded	

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
160																			
121.12	165		Borehole terminated at a depth of 165.0' on 10/19/2011. Overdrilled hole to 165.0' for PS Logging.																
			For corrosion test results, see Appendix E.																
			Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.																
116.12	170		See Borehole Log Legend for soil classification chart and key to test data and sampler type.																
111.12	175																		
106.12	180																		



REPORT TITLE BORING RECORD				HOLE ID S0010R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 9 of 9

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2148215.466 / E6330773.973 (National Grid)		HOLE ID S0012R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING PS Logging		SURFACE ELEVATION 287.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		ASPHALT (7") (AC).		S01	0			60	60									
			AGGREGATE BASE (5") (AB).																
			SILTY SAND (SM); medium dense; reddish brown; moist; medium; subrounded; trace GRAVEL; rapid dilatancy; [FILL].								18.2								
282.57	5		Poorly graded SILTY SAND (SM); medium dense; light reddish brown; moist; mostly medium; subrounded; few SILT; rapid dilatancy; becomes brown [ALLUVIUM].		S02	5	6-11-11	22	18	18									
						6.5					20.2	6.1							
					S03	6.5	5-5-11	16	18	14									
						8					18.3	12							
					S04	8	10-15-22	37	18	16									
						9.5													
277.57	10		SILT with SAND (ML); hard; brownish gray; mostly fine; slow dilatancy; weak cementation; few calcite seams.		S05	9.5	25-33-26	59	18	17									
						11					73.7	24.4							
			Sandy SILT (ML); very stiff; mottled olive brown to brown; fine; some SAND; weak cementation; few calcite seams.		S06	11	9-12-14	26	18	18									
						12.5					65.7	27.3							
			SILTY SAND (SM); medium dense; brown; medium; subangular; some SILT; rapid dilatancy.		S07	12.5	5-6-8	14	18	15									
						14					21.4	15.5							
272.57	15				S08	14	18-21-33	54	18	17									
						15.5					37	26.1							
			Sandy SILT (ML); very stiff; brownish gray variegated reddish brown; wet; low plasticity; medium dry strength; low toughness.																

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0012R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 1 of 9

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2148215.466 / E6330773.973 (National Grid)		HOLE ID S0012R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING PS Logging		SURFACE ELEVATION 287.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		SILT (ML); very stiff; brownish gray.		S09	20	10-14-16	30	18	17	97.3	33.2							
			SILTY SAND (SM); dense; brown; wet; mostly fine; some SILT; slow dilatancy.			21.5					68.4								
262.57	25		SILTY SAND (SM); medium dense; grayish brown to gray mottled with brown; wet; mostly fine; little SILT; slow dilatancy; dark brown hydrocarbon contamination along 1-inch thick seam in 2 locations.		S10	25	9-8-18	26	18	18									Hydro-carbon contamination. Strong smell and easily visible.
						26.5													
257.57	30		30' grades to dense; gray to grayish brown; rapid dilatancy.		S11	30	8-11-24	35	18	18									Hydro-carbon contamination.
						31.5													
252.57	35		Poorly-graded SAND with SILT (SP-SM); medium dense; light brownish gray; wet; medium; rapid dilatancy.		S12	35	8-9-11	20	18	15	6.8								
						36.5													
247.57	40																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0012R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 2 of 9	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2148215.466 / E6330773.973 (National Grid)		HOLE ID S0012R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING PS Logging		SURFACE ELEVATION 287.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 165 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	40		SILTY SAND (SM); medium dense; light brownish gray; wet; medium; some fines; rapid dilatancy.		S13	40	12-12-15	27	18	17	26.3								
	45		Poorly-graded SAND with SILT (SP-SM); medium dense; light brownish gray; wet; medium; little SILT; rapid dilatancy.		S14	45	9-11-12	23	18	17	14	14.8							
	50		SILTY SAND (SM); medium dense; reddish brown; wet; fine to medium; subrounded; little SILT; trace GRAVEL; slow dilatancy.		S15	50	17-22-28	50	18	18	48.5	18.5							
	55		Poorly-graded SAND with SILT (SP-SM); dense; reddish brown; wet; mostly medium grained sand; trace fines; rapid dilatancy; mostly quartz, muscovite and a mafic material.		S16	55	16-19-23	42	18	17	8.1								

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0012R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 3 of 9	



PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2148215.466 / E6330773.973 (National Grid)		HOLE ID S0012R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING PS Logging		SURFACE ELEVATION 287.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
60			Poorly-graded SAND with SILT (SP-SM); dense; reddish brown; wet; mostly medium; trace fines; rapid dilatancy; mostly quartz, muscovite and a mafic mineral..		S17	60	15-17-17	34	18	16	6.4								
222.57	65		Poorly graded SAND (SP); dense; reddish brown; wet; mostly medium; trace fines; rapid dilatancy; mostly quartz, muscovite and a mafic mineral..		S18	65	14-20-24	44	18	18									
217.57	70		Sandy SILT (ML); very dense; reddish brown reddish brown; subrounded; some SAND; slow dilatancy; weak cementation; few dark mafic partings.		S19	70	16-27-30	57	18	18	50.1	16.2							
212.57	75		SILTY SAND (SM); very dense; multicolored brownish red light brown, gray and brown; wet; mostly fine; some SILT; trace fine GRAVEL; black oxidation partings along fissures.		S20	75	42-50	50/3"	9	9	28.8	24.6							
207.57	80																		

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0012R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 4 of 9



PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2148215.466 / E6330773.973 (National Grid)		HOLE ID S0012R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING PS Logging		SURFACE ELEVATION 287.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
80			SILT with SAND (ML); hard; multicolored brownish brown; wet; some SAND; reddish seams.		S21	80	20-35-49	84	18	15	74	29.3							
						81.5													
202.57	85		SILTY SAND (SM); very dense; grayish brown; wet; fine; little SILT; slow dilatancy.		S22	85	16-34-62	96	18	16	73.8								
			SILT with SAND (ML); hard; brownish gray; wet; mostly SILT; low plasticity; low dry strength; low toughness; reddish brown oxidation seams in multiple locations.			86.5													
197.57	90		SILTY SAND (SM); dense; grayish brown; little SILT; slow dilatancy.		S23	90	14-12-24	36	18	18	16.2	30.1							
						91.5													
192.57	95		SANDY SILT (ML); hard; grayish brown; wet; some SAND; low plasticity; low dry strength; low toughness.		S24	95	17-30-52	82	18	16	67.8								
						96.5													
187.57	100																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0012R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 5 of 9

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2148215.466 / E6330773.973 (National Grid)		HOLE ID S0012R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING PS Logging		SURFACE ELEVATION 287.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
100			SILTY SAND (SM); very dense; grayish brown; wet; some SILT; slow dilatancy; interbedded; variegated dark brown parting.		S25	100	13-30-100	130/10"	16	14									
						101.5													
182.57	105		SILT with SAND (ML); very stiff; grayish brown; wet; some SAND; slow dilatancy; slow dilatancy.		S26	105	14-14-13	27	18	18									
						106.5					79.4	29.9							
177.57	110		110' grades to hard; grayish brown to reddish brown; wet; mostly medium.		S27	110	24-25-56	81	18	18									
						111.5					73.3								
172.57	115		SILTY SAND (SM); medium dense; brown; wet; mostly medium; subangular; little fine SAND; little coarse SAND; trace GRAVEL; rapid dilatancy; weak cementation.		S28	115	9-11-15	26	18	18									
						116.5					29.8								
167.57	120																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0012R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 6 of 9

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2148215.466 / E6330773.973 (National Grid)		HOLE ID S0012R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING PS Logging		SURFACE ELEVATION 287.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 165 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
120			SILTY SAND (SM); very dense; wet; fine to coarse SAND; rapid dilatancy; moderate cementation in the last 3 inches.	S29	120	120	16-16-34	50	18	18									
						121.5													
162.57	125		125' grades to fine; slow dilatancy; (2-inch thick layer containing very dense; reddish brown silty sand from 126.0' to 126.2').	S30	125	125	19-29-49	78	18	18									
						126.5					30.7	43.5							
			129' grades to dense; light brownish gray; rapid dilatancy; light gray seam 1/4-inch thick.																
157.57	130		Poorly graded SAND (SP); dense; light brownish gray; wet; medium; subrounded; few fines; rapid dilatancy.	S31	130	130	18-17-20	37	18	15									
						131.5													
			Sandy SILT (ML); very dense; brownish gray; wet; fine; interbedded with grayish brown, hard, wet; non-plastic; medium toughness.																
152.57	135		135.8', olive brown; wet; medium to fine; subrounded; few coarse SAND; rapid dilatancy.	S32	135	135	19-27-23	50	18	17									
						136.5					56.9	27.2							
			SILT (ML); hard; light brownish gray; wet; little CLAY; some fine SAND; medium plasticity; medium dry																
147.57	140																		PP: 1.5 tsf TV: 1.0 tsf

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0012R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 7 of 9	

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2148215.466 / E6330773.973 (National Grid)		HOLE ID S0012R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING PS Logging		SURFACE ELEVATION 287.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	140		strength; medium toughness; mottled with dark reddish brown oxidation staining.		S33	140	19-27-37	64	18	17									
						141.5					86.5	32.8	40	10					
142.57	145		SILTY SAND (SM); dense; olive brown; wet; fine; some SILT; slow dilatancy; mottled with reddish brown oxidation partings.		S34	145	17-22-25	47	18	16									
						146.5													
137.57	150		Sandy SILT (ML); hard; grayish brown; wet; some SAND; slow dilatancy.		S35	150	9-10-15	25	18	17									
						151.5					61.8	36							
132.57	155																		
127.57	160																		

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0012R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 8 of 9

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-24-11	COMPLETION DATE Oct-25-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2148215.466 / E6330773.973 (National Grid)		HOLE ID S0012R
DRILLING CONTRACTOR/DRILLER Gregg/D. Selders			IN-SITU TESTING PS Logging		SURFACE ELEVATION 287.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-165')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
160																			
122.57	165																		
117.57	170																		
112.57	175																		
107.57	180																		

Borehole terminated at a depth of 165.0' on 10/25/2011. Overdrilled hole to 165.0' for PS Logging.

For corrosion test results, see Appendix E.

Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.

See Borehole Log Legend for soil classification chart and key to test data and sampler type.



REPORT TITLE BORING RECORD

DIST. COUNTY ROUTE POSTMILE

HOLE ID
S0012R

EA

PROJECT OR BRIDGE NAME
California High-Speed Train

BRIDGE NUMBER PREPARED BY
D. Maggi/T. Curran

DATE
2-20-12

SHEET
9 of 9

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-19-11	COMPLETION DATE Oct-20-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2146714.433 / E6332311.651 (National Grid)	
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			IN-SITU TESTING Standpipe piezometer	
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop	
BOREHOLE BACKFILL AND COMPLETION Piezometer			TOTAL DEPTH OF BORING 151.5 ft	
			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS Not Recorded Not Recorded	

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		Poorly graded SAND (SP); brown; moist to dry; trace SILT; fine medium SAND; trace coarse SAND; weak cementation.		S01	0			60	60									1" concrete pavement; garbage barrel
			4.0', ceramic and glass debris in cuttings.			5					48.3								Modified Proctor: Max γ_d = 125.5 pcf Optimum W_L = 9.8%
281.05	5		Poorly graded SAND (SP); very dense; reddish brown; moist to dry; trace SILT; fine medium SAND; trace coarse SAND; weak cementation.		S02	5	26-26-50	76/11"	17	16									
			Poorly graded SAND with SILT (SP-SM); very dense; grayish brown with reddish brown mottling; moist; few SILT; fine SAND; trace coarse SAND; weak cementation.		S03	6.5	26-19-12	31	18	14		30.8	10.1						6.5' mud tub set; 6" drag bit
			Poorly graded SAND (SP); dense; reddish brown; wet; trace SILT; fine medium SAND; weak cementation.		S04	8	37-50	50/3"	9	9		28.3	12						
			9.5', SP-SM - refer to 5.8', grades to wet brown with reddish brown mottling.		S05	9.5	46-50	50/6"	12	12		65.8	23.8						
276.05	10		11.0', SP - refer to 6.5'.		S06	11	18-34-27	61	18	14		47.1	16.3						
			11.7', SP-SM refer to 5.8', grades to wet.			12.5					65.4								
			12.5', grades to dense; grayish brown with grayish-white mottling. All the fine content suggests SILT.		S07	12.5	21-18-19	37	18	12		75.1	18.5						
			14.0', grades to medium dense; grayish brown with reddish brown and gray mottling.		S08	14	14-11-11	22	18	12		73.9	16.2						
271.05	15					15.5													
266.05	20																		

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0013AR	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 1 of 8



PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-19-11	COMPLETION DATE Oct-20-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2146714.433 / E6332311.651 (National Grid)		HOLE ID S0013AR
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 286.05 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 151.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		20.0', grades to dense; grayish brown with brown mottling.		S09	20	21-18-28	46	18	16	76.5								
261.05	25		25.0', grades to grayish brown with reddish brown, brown, and grayish white mottling.		S10	25	16-18-16	34	18	14	78.6	24.5							
						26.5													
						28													
256.05	30		30.0', grades to grayish brown with frequent reddish brown mottling.		S11	30	13-14-20	34	18	18	62.4	21.7							
						31.5													
251.05	35		35.0', grades to very dense; reddish brown.		S12	35	20-25-31	56	18	18	67.6								
			36.0', grades to grayish brown with reddish brown mottling.																
						36.5													
246.05	40																		

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0013AR
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 2 of 8	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-19-11	COMPLETION DATE Oct-20-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2146714.433 / E6332311.651 (National Grid)		HOLE ID S0013AR
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 286.05 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 151.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	40		40.0', grades to dense; reddish brown with grayish brown mottling.		S13	40	39-18-18	36	18	18									
						41.5					84.7	26.6							
241.05	45		Poorly graded SAND (SP); very dense; brown with reddish brown mottling; wet; trace SILT; fine SAND; weak cementation.		S14	45	29-50	50/5.5"	12	11									
						46.5					38	15							
236.05	50		50.0', grades to reddish brown; fine to medium SAND; trace coarse SAND.		S15	50	18-28-33	61	18	16									
						51.5													
231.05	55		Poorly graded SAND with SILT (SP-SM); dense; grayish brown with reddish brown mottling; few SILT; fine SAND; weak cementation.		S16	55	10-19-22	41	18	14									
						56.5					77								
226.05	60																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0013AR	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 3 of 8

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-19-11	COMPLETION DATE Oct-20-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2146714.433 / E6332311.651 (National Grid)		HOLE ID S0013AR
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 286.05 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 151.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
60			60.0', grades to very dense.		S17	60	12-26-27	53	18	14	71.8	24.3							
						61.5													
221.05	65		Poorly graded SAND (SP); dense; brown with reddish brown mottling; trace SILT; fine to medium SAND; weak cementation.		S18	65	12-19-26	45	18	12									
						66.5													
216.05	70		70.0', grades to very dense; reddish brown; medium-fine SAND.		S19	70	21-29-34	63	18	18	19.4								
						71.5													
211.05	75				S20	75	11-20-31	51	18	18									
						76.5													
206.05	80																		

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0013AR
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 4 of 8	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-19-11	COMPLETION DATE Oct-20-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2146714.433 / E6332311.651 (National Grid)		HOLE ID S0013AR
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 286.05 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 151.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
80			Poorly graded SAND with SILT (SP-SM); very dense; grayish brown with reddish brown mottling; wet; few SILT; fine SAND; weak cementation.	X	S21	80	29-50	50/5.5"	12	10		60.6	23						
						81.5													
201.05	85		85.0', grades to brown.	X	S22	85	31-31-44	75	18	17									
						86.5													
196.05	90		Poorly graded SAND (SP); dense; brown; wet; trace SILT; fine medium SAND; weak cementation.	X	S23	90	11-14-56	70	18	7									
						91.5													
191.05	95		SILTY SAND (SM); very dense; grayish brown; wet; little SILT; trace medium fine SAND; weak cementation.	X	S24	95	32-50	50/4"	10	9		90.9							
						96.5													
186.05	100																		

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0013AR
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 5 of 8	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-19-11	COMPLETION DATE Oct-20-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2146714.433 / E6332311.651 (National Grid)		HOLE ID S0013AR
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 286.05 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 151.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
100			Poorly graded SAND (SP); very dense; brown; wet; trace SILT; medium fine SAND; weak cementation.	X	S25	100	17-20-30	50	18	15									
						101.5													
181.05	105		105.0', grades to weak moderate cementation.	X	S26	105	29-50	50/6"	12	11									
						106.5					34.4	17.4							
176.05	110		110.0', grades to medium dense fine SAND.	X	S27	110	12-12-17	29	18	15									
						111.5					67.1								
171.05	115		Poorly graded SAND with SILT (SP-SM); very dense; grayish brown with brown mottling; few SILT; fine SAND; weak cementation.	X	S28	115	42-50	50/3"	9	11									
						116.5					54.3	26.8							

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0013AR
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 6 of 8	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-19-11	COMPLETION DATE Oct-20-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2146714.433 / E6332311.651 (National Grid)		HOLE ID S0013AR
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 286.05 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 151.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests	
	120		Poorly graded SAND with SILT (SP-SM); very dense; brown; wet; fine; little SILT; weak cementation. 121.0', coarser; less fines; trace GRAVEL.	X	S29	120 121.5	38-41-50	91	18	9										Silt content may be overestimated fro 120 to end
161.05	125		SILTY SAND (SM); very dense; grayish brown; wet; fine; interbedded SAND and SILT; some fines; weak cementation.	X	S30	125 126.2	20-27-38	65	18	14										
											73									
156.05	130		SILTY SAND (SM); very dense; yellowish brown; wet; fine; trace fines; weak cementation.	X	S31	130 131.2	14-33-50	83/ 11"	17	13										
151.05	135		SILTY SAND (SM); very dense; yellowish brown; wet; fine; some SILT; weak cementation.	X	S32	135 136.5	24-25-26	51	18	16										
											65									
146.05	140																			

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0013AR
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 7 of 8	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-19-11	COMPLETION DATE Oct-20-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2146714.433 / E6332311.651 (National Grid)	
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			HOLE ID S0013AR	
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			SURFACE ELEVATION 286.05 ft (NAVD88)	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			BOREHOLE DIAMETER 4.875 in	
BOREHOLE BACKFILL AND COMPLETION Piezometer			HAMMER EFFICIENCY, ERI 68%	
			TOTAL DEPTH OF BORING 151.5 ft	
			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS Not Recorded Not Recorded	

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
140			interbedded SAND and SILT.		S33	140	19-22-37	59	18	16									
						141.5													
141.05	145		SANDY SILT (ML); hard; grayish brown; wet; some SAND; low cementation.		S34	145	22-24-35	59	18	13									
						146.5													
136.05	150		SILTY SAND (SM); very dense; grayish brown; wet; fine; little fines; low cementation.		S35	150	20-24-32	56	18	17									
						151.5													
Borehole terminated at a depth of 151.5' on 10/20/2011. Piezometer installed.																			
For corrosion test results, see Appendix E.																			
Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.																			
See Borehole Log Legend for soil classification chart and key to test data and sampler type.																			
131.05	155																		
126.05	160																		



REPORT TITLE BORING RECORD				HOLE ID S0013AR
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 8 of 8

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-20-11	COMPLETION DATE Oct-21-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2143960.181 / E6334723.77 (National Grid)		HOLE ID S0014AR
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 285.42 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method Casing Depth	Remarks/ Other Tests
	0		ASPHALT (7") (AC).	S01	0			60	60								
			AGGREGATE BASE (9") (AB).														
			SANDY SILT (ML); stiff; brown; moist; [ALLUVIUM].							67.7							
280.42	5			S02	5	5-6-6	12	18	18								
					6.5					53.5	17.4						
			SILTY SAND (SM); medium dense; grayish brown with brown mottling; moist; some SILT; rapid dilatancy.	S03	6.5	7-9-7	16	18	16								
					8					40.9	14.9						
				S04	8	6-8-9	17	18	15						1.9		
					9.5					44.4	16						
275.42	10		SANDY CLAY (CL); stiff; brown with white seams; some fine SAND; few SILT; slow dilatancy; weak cementation.	S05	9.5	4-6-7	13	18	18								
					11					59.1	21.3	27	10				
			SILTY SAND (SM); medium dense; brown; little SILT; rapid dilatancy.	S06	11	5-8-9	17	18	14								S06 and S07 contains pinkish red contaminant along seams and partings
					12.5					29.7	14.9						
			SANDY CLAY (CL); very stiff; brown; some SAND.	S07	12.5	6-8-10	18	18	16								
					14					58.9	21.4	65	49	3.4			
270.42	15		SILTY SAND (SM); medium dense; brown; wet; little SILT; rapid dilatancy.	S08	14	7-11-12	23	18	15								S08 contains the contaminant throughout sample Silt lens from 14.3' - 14.5' and 14.6' - 14.8'
					15.5					21.6							

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0014AR	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 1 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-20-11	COMPLETION DATE Oct-21-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2143960.181 / E6334723.77 (National Grid)		HOLE ID S0014AR
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 285.42 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
260.42	20				S09	20	6-9-10	19	18	15									
						21.5					43.8	8.2							
255.42	25		25.0', grades dense.		S10	25	10-17-15	32	18	14									
						26.5					25.3								
250.42	30		SAND with SILT (SP-SM); medium dense; reddish brown; wet; medium SAND; rapid dilatancy.		S11	30	9-12-14	26	18	14									
						31.5					6	12.3							
245.42	35		SILTY SAND (SM); very dense; reddish brown; medium SAND; some SILT; rapid dilatancy; weak cementation.		S12	35	56-18-18	36	18	18									
						36.5					33.9	12							

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0014AR
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 2 of 5	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-20-11	COMPLETION DATE Oct-21-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2143960.181 / E6334723.77 (National Grid)		HOLE ID S0014AR
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 285.42 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	40		SANDY CLAY (CL); hard; reddish brown; some fine SAND; medium plasticity; slow dilatancy.		S13	40	11-19-31	50	18	17									
						41.5					60.8	16.9	30	19					
240.42	45				S14	45	14-16-21	37	18	18									
						46.5					55.2	16.4	28	17					
235.42	50		SILTY SAND (SM); dense; reddish brown; with iron oxide staining.		S15	50	7-18-20	38	18	17									
						51.5					42.1	19.3							
230.42	55		55.0', grades very dense; trace fine gravel.		S16	55	14-25-36	61	18	15									
						56.5													Gravel experienced from 55.0' - 55.6'
225.42	60																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0014AR
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 3 of 5	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-20-11	COMPLETION DATE Oct-21-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2143960.181 / E6334723.77 (National Grid)		HOLE ID S0014AR
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 285.42 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
60			SANDY SILT (ML); hard; reddish brown with gray mottling; some fine SAND; no dilatancy; weak cementation.		S17	60	17-26-36	62	18	18									
						61.5					65.6	24.2							
220.42	65		SILTY SAND (SM); very dense; reddish brown with gray mottling; some SILT; weak cementation.		S18	65	22-30-30	60	18	18									
						61.5					37.1								
215.42	70				S19	70	19-28-37	65	18	17									
						71.5					49.8	14.9							
210.42	75		SANDY SILT (ML); hard; red and grayish brown; some medium SAND; trace subrounded GRAVEL; slow dilatancy.		S20	75	16-21-20	41	18	18									
						76.5					58.5	22.7							
205.42	80																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0014AR
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 4 of 5	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-20-11	COMPLETION DATE Oct-21-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2143960.181 / E6334723.77 (National Grid)		HOLE ID S0014AR
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 285.42 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
80					S21	80	26-37-39	76	18	16									1/4 inch thick laminations from 80.0' - 80.5'
						81.5													
			<p>Borehole terminated at a depth of 81.5' on 10/21/2011. Conducted SPT Sampling on 5 foot intervals with the exception of continuous sampling from 5.0 to 15.5 feet. Mud Rotary was used to create a 3 3/4 inch hole using a claw drag bit. The borehole was backfilled using neat cement grout to the satisfaction of the City of Fresno grouting inspector.</p> <p>For corrosion test results, see Appendix E.</p> <p>Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.</p> <p>See Borehole Log Legend for soil classification chart and key to test data and sampler type.</p>																
200.42	85																		
195.42	90																		
190.42	95																		
185.42	100																		



REPORT TITLE BORING RECORD				HOLE ID S0014AR	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 5 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-20-11	COMPLETION DATE Oct-20-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2145253.122 / E6333704.642 (National Grid)		HOLE ID S0014R
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 284.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		ASPHALT (7") (AC).		S01	0			60	60									
			AGGREGATE BASE (9") (AB).																
			SANDY SILT (ML); brown; moist; some medium SAND; trace GRAVEL; [ALLUVIUM].								53.7								
						5													
279.57	5		SILTY SAND (SM); loose; grayish brown with reddish brown mottling; moist; mostly fine SAND; little fines; rapid dilatancy.		S02	5	3-3-3	6	18	18									
						6.5					17.5	7.5							
			6.5', grades very dense.		S03	6.5	3-7-36	43	18	16									
						8					21.5	11.1							
			SANDY SILTY CLAY (CL-ML); hard; brown with white seams; moist; some fine SAND; little SILT; slow dilatancy; weak cementation.		S04	8	30-22-23	45	18	16									
						9.5					53.9	19.9	21	5					
274.57	10		SILTY SAND (SM); loose; brown with white seams; mostly fine SAND; some fines; slow dilatancy; weak cementation.		S05	9.5	4-3-5	8	18	15									
						11					47.2	16.5							
			Trace GRAVEL.																
			CLAY with SAND (CL); stiff; grayish brown; little fine SAND.		S06	11	3-4-6	10	18	15									
						12.5					70.6	19.3	28	12					
											15	19.3							
			SANDY SILT (ML); very stiff; grayish brown; wet; low toughness.		S07	12.5	5-10-13	23	18	17									
						14					59	20.1							
269.57	15				S08	14	7-11-13	24	18	14									
						15.5					60.2								

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0014R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 1 of 5

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-20-11	COMPLETION DATE Oct-20-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2145253.122 / E6333704.642 (National Grid)		HOLE ID S0014R
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 284.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		SILTY SAND (SM); medium dense; brownish gray; wet; some SILT; slow dilatancy.		S09	20	9-9-10	19	18	14									
						21.5													
259.57	25		SILTY SAND (SM); medium dense; brownish gray; wet; subrounded; some SILT; rapid dilatancy.		S10	25	8-12-15	27	18	17									
						26.5					43.9	12.6							
254.57	30		Poorly graded SAND (SP); medium dense; reddish brown; wet; medium; some fine SAND; trace fines.		S11	30	6-7-9	16	18	14									
						31.5													
249.57	35		SANDY CLAY (CL); hard; reddish brown; wet; some medium SAND; low plasticity; high dry strength.		S12	35	13-17-22	39	18	18									
						36.5					60.5		27	12					
244.57	40																		PP: 4.5 tsf TV: 2.5 tsf

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0014R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 2 of 5

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-20-11	COMPLETION DATE Oct-20-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2145253.122 / E6333704.642 (National Grid)		HOLE ID S0014R
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 284.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	40		SILTY SAND (SM); medium dense; reddish brown; wet; some CLAY; medium plasticity; slow dilatancy.	S13	40	41.5	5-4-7	11	18	17	47.9	22.7							
239.57	45		45.0', increasing fines content.	S14	45	46.5	4-6-8	14	18	17	49.4		28	17					
234.57	50		SANDY SILT (ML); hard; slightly mottled reddish brown oxidized staining; wet; some fine SAND; weak cementation.	S15	50	51.5	16-25-26	51	18	18	59.5	33.5	33	2					
229.57	55		SILTY CLAY with SAND (CL-ML); hard; brownish gray; wet; little fine SAND.	S16	55	56.5	12-20-47	67	18	17	75.1	29.4	27	5					
224.57	60																		

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0014R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 3 of 5	



PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-20-11	COMPLETION DATE Oct-20-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2145253.122 / E6333704.642 (National Grid)		HOLE ID S0014R
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 284.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft





Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
60			SAND with SILT (SP-SM); dense; brownish gray; wet; few SILT; rapid dilatancy.	X	S17	60	13-16-19	35	18	14	11.1								
						61.5													
219.57	65		SILTY SAND (SM); dense; mottled reddish brown; wet; some fines.	X	S18	65	11-19-24	43	18	15	37.8								
						66.5													
214.57	70		70.0', grades very dense.	X	S19	70	16-29-38	67	18	17									
						71.5													
209.57	75		75.0', grades mottled red with grayish brown.	X	S20	75	10-39-50	89/9"	15	15									
						76.5													
204.57	80																		Reached refusal at 50 blow counts; 3.25" left to drive

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0014R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 4 of 5	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-20-11	COMPLETION DATE Oct-20-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2145253.122 / E6333704.642 (National Grid)		HOLE ID S0014R
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 284.57 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-81.5')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 3.75 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 81.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests	
	80				S21	80	27-50-90	140	18	18										
						81.5														Possible hematite staining
			Borehole terminated at a depth of 81.5' on 10/20/2011.																	
			For corrosion test results, see Appendix E.																	
			Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.																	
			See Borehole Log Legend for soil classification chart and key to test data and sampler type.																	
199.57	85																			



REPORT TITLE BORING RECORD				HOLE ID S0014R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 5 of 5

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-18-11	COMPLETION DATE Oct-18-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2141424.139 / E6337011.693 (National Grid)	
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			IN-SITU TESTING	
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-51.5')			DRILL RIG Failing 1500	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop	
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			TOTAL DEPTH OF BORING 51.5 ft	
			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS Not Recorded Not Recorded	

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method Casing Depth	Remarks/ Other Tests
	0		SILTY SAND (SM); reddish brown; dry; fine to medium SAND; some fines; weak cementation; [FILL].	S01	0			60	60								2" of asphalt Bulk sample taken in bucket
	5		5.0', grades very dense; decreasing fines content.	S02	5	1-19-30	49	18	18	34.5							Modified Proctor: Max γ_d = 130.3 pcf Optimum W_L = 8.2%
281.65			Poorly graded SAND (SP); dense; light reddish brown; moist to dry; fine to medium SAND; trace SILT; weak cementation; [ALLUVIUM].	S03	6.5	33-32-19	51	18	9	20.9	7						
			Poorly graded SAND with SILT (SP-SM); very dense; light yellowish brown; wet; fine to medium SAND; few fines; trace to medium coarse SAND; weak cementation.	S04	8	8-12-15	27	18	17	16.7	14.3						Mud tub set at 6.5'
			SILTY SAND (SM); medium dense; brown; wet; fine to medium SAND; some fines; trace medium coarse SAND; weak cementation.	S05	9.5	9-11-16	27	18	18	33.9	19.7						
276.65	10		SANDY SILT (ML); hard; light brown with reddish brown mottling; wet; fines; some fine to medium SAND; trace medium coarse SAND; weak cementation.	S06	11	20-21-23	44	18	16	31.6							
			SILTY CLAY with SAND (CL-ML); hard; light brown; wet; little SAND; weak cementation.	S07	12.5	15-14-16	30	18	15	56.9	19.9						
				S08	14	10-18-24	42	18	12	72.5		24	4				
271.65	15				15.5					75.7	21.7	23	5				
266.65	20																

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0015R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 1 of 3

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-18-11	COMPLETION DATE Oct-18-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2141424.139 / E6337011.693 (National Grid)		HOLE ID S0015R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			IN-SITU TESTING		SURFACE ELEVATION 286.65 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-51.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 51.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		SILTY SAND (SM); dense; light brown; fine to medium SAND; some fines; weak cementation.		S09	20	12-18-26	44	18	15	44.3	15.6							20.0', switch to 4" bit
			Poorly graded SAND (SP); dense; light brown; wet; trace SILT; fine to medium SAND; trace medium coarse SAND; weak cementation.			21.5													
261.65	25		SILTY SAND (SM); dense; light brown with reddish brown mottling; wet; fine SAND; some fines; weak cementation.		S10	25	11-15-16	31	18	18									
			26.0', grades to fine medium SAND.			26.5					30.8	22.1							
256.65	30		Poorly graded SAND with SILT (SP-SM); dense; light brown with reddish brown mottling; wet; mostly fine to medium SAND; few fines; weak cementation.		S11	30	10-17-23	40	18	12	6.5	21.2							
			SILT (ML); hard; grayish brown; wet; few fine SAND; trace medium SAND; weak cementation.			31.5					85.5								
251.65	35		Poorly graded SAND with SILT (SP-SM); dense; grayish brown with red mottling; wet; fine SAND; few fines; weak cementation.		S12	35	21-21-24	45	18	16									
			SANDY SILT (ML); hard; reddish brown; wet; fines; some fine SAND; weak cementation.			36.5					56.4	17.5							
246.65	40																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0015R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 2 of 3

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-18-11	COMPLETION DATE Oct-18-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2141424.139 / E6337011.693 (National Grid)		HOLE ID S0015R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			IN-SITU TESTING		SURFACE ELEVATION 286.65 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-51.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 51.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	40		SILTY SAND (SM); dense; reddish brown; wet; fine SAND; some SILT; weak cementation.		S13	40	14-14-16	30	18	14									
						41.5					49.8	17.5							
241.65	45		45.0', grades to very dense.		S14	45	16-32-35	67	18	16									
						46.5													
236.65	50		SILTY CLAY (CL-ML); hard; grayish brown with reddish brown mottling; wet; trace fine SAND; weak cementation.		S15	50	20-26-29	55	18	17									
			Poorly graded SAND (SP); very dense; light reddish brown; wet; fine SAND; few SILT; weak cementation.			51.5					91.9		25	4					
			Borehole terminated at a depth of 51.5' on 10/18/2011.																
			For corrosion test results, see Appendix E.																
			Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.																
231.65	55		See Borehole Log Legend for soil classification chart and key to test data and sampler type.																
226.65	60																		

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0015R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 3 of 3	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-26-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2138779.582 / E6338686.271 (National Grid)		HOLE ID S0016R
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 288.82 ft (NAVD88)
DRILLING METHOD ROTARY(0'-160')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 160 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		ASHPHALT (5") (AC).		S01	0			60	60									
			AGGREGATE BASE (5") (AB).																
			SANDY SILT (ML); brown; moist; subrounded; some fine SAND; trace GRAVEL; rapid dilatancy; [ALLUVIUM].								61.1								
283.82	5		5.0', grades grayish brown; wet.		S02	5			18	18									
											62.5	11.8	19	3					
278.82	10		SILTY SAND (SM); dense; grayish brown; wet; medium; subrounded; some SILT; slow dilatancy; oxidation seams.		S03	10	12-15-16	31	18	16									
											30	11.9							
273.82	15		15.0', grades medium dense; brown; little SILT; oxidation seams.		S04	15	6-6-8	14	18	16									
											24.4								
268.82	20																		

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0016R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 1 of 9	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-26-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2138779.582 / E6338686.271 (National Grid)		HOLE ID S0016R
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 288.82 ft (NAVD88)
DRILLING METHOD ROTARY(0'-160')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 160 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		20.0', grades very dense; reddish brown; some SILT; oxidation staining.		S05	20	28-36-23	59	18	16									
						21.5					36.5	11.7							
263.82	25		Poorly graded SAND with SILT (SP-SM); medium dense; brownish gray; wet; medium; subrounded; few SILT; rapid dilatancy; mostly quartz.		S06	25	9-11-16	27	18	13									
						26.5					6.1								
258.82	30		30.0', oxidation partings.		S07	30	8-11-9	20	18	12									
						31.5													
253.82	35				S08	35	8-10-12	22	18	13									
						36.5					7.1	15.2							
248.82	40																		

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0016R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 2 of 9	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-26-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2138779.582 / E6338686.271 (National Grid)		HOLE ID S0016R
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 288.82 ft (NAVD88)
DRILLING METHOD ROTARY(0'-160')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 160 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	40		40.0', trace partings of black mafic minerals in the bottom 2 inches of the sample.		S09	40	6-7-12	19	18	11	14.4								
						41.5													
243.82	45		SILTY SAND (SM); dense; reddish brown; wet; subrounded; medium little SILT; black mafic mineral partings.		S10	45	16-15-19	34	18	15	17.9								
						46.5													
238.82	50		SANDY SILTY CLAY (CL-ML); very stiff; grayish brown; wet; little SAND; low plasticity; high dry strength; medium toughness.		S11	50	10-11-15	26	18	18	37.6	15.3							
			CLAY with SAND (CL); very stiff; grayish brown; wet; little SAND; medium plasticity; high dry strength; medium toughness.			51.5					73.3	23.7	30	14					
233.82	55		SILTY SAND (SM); very dense; reddish brown; wet; fine to medium; some SILT.		S12	55	12-20-30	50	18	13	33.3	13.5							
						56.5													

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0016R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 3 of 9	



PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-26-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2138779.582 / E6338686.271 (National Grid)		HOLE ID S0016R
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 288.82 ft (NAVD88)
DRILLING METHOD ROTARY(0'-160')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 160 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	60				S13	60	19-28-32	60	18	18									
						61.5					42.7	14.9							
223.82	65		Poorly graded SAND with SILT (SP-SM); dense; brownish gray; wet; medium; subrounded; few SILT; oxidized partings.		S14	65	12-14-16	30	18	11									
						66.5					9	15.5							
218.82	70		SANDY SILT (ML); hard; brownish gray to reddish brown; wet; some fine SAND; weak cementation; two distinct calcite seams 1/2 inch thick.		S15	70	14-29-69	98	18	18									
						71.5					52.7	20							
213.82	75		75.0', grades very stiff; grayish brown; little SAND; trace GRAVEL; low plasticity; slow dilatancy; no cementation.		S16	75	5-12-18	30	18	15									
						76.5					64.4	24.9	22	2					
208.82	80																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0016R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 4 of 9	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-26-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2138779.582 / E6338686.271 (National Grid)		HOLE ID S0016R
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 288.82 ft (NAVD88)
DRILLING METHOD ROTARY(0'-160')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 160 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	80		SILTY SAND (SM); dense; grayish brown; wet; some SILT; weak cementation.		S17	80	9-15-26	41	18	18									
						81.5					46.3	22							
203.82	85		SAND with SILT (SP-SM); dense; grayish brown; wet; few SILT.		S18	85	16-19-21	40	18	15									
						86.5					10.3								
198.82	90		SILTY SAND (SM); very dense; grayish brown; wet; some SILT.		S19	90	21-30-40	70	18	18									
						91.5					43.7	15.6							
193.82	95		95.0', grades dense; little SILT.		S20	95	12-20-25	45	18	18									
						96.5					26.9	18.7							
188.82	100																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0016R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 5 of 9	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-26-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2138779.582 / E6338686.271 (National Grid)		HOLE ID S0016R
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 288.82 ft (NAVD88)
DRILLING METHOD ROTARY(0'-160')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 160 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
100			Poorly graded SAND (SP-SM); dense; brown; wet; medium to coarse; subrounded; few SILT.		S21	100	16-19-24	43	18	18									
						101.5					12.4	19.7							
183.82	105		105.0', grades medium dense; grayish brown.		S22	105	12-14-15	29	18	12									
						106.5					7.7								
178.82	110		110.0', grades dense; brown.		S23	110	22-14-19	33	18	18									
						111.5					12.5								
			SILTY SAND (SM); dense; brown; wet; fine; some SILT.								44.7	25.9							
173.82	115		SANDY SILT (ML); hard; brown with gray seams; wet; some fine SAND; slow dilatancy.		S24	115	18-30-63	93	18	18									
						116.5					55.3	20.3							

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0016R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 6 of 9	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-26-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2138779.582 / E6338686.271 (National Grid)		HOLE ID S0016R
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 288.82 ft (NAVD88)
DRILLING METHOD ROTARY(0'-160')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 160 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
120			CLAY (CL); hard; olive brown; wet; few SAND; medium plasticity; slow dilatancy.		S25	120	15-26-33	59	18	18									
						121.5					88	32.7	38	15					
163.82	125		SANDY SILT (ML); hard; light olive brown; wet; some fine SAND; trace medium SAND; slow dilatancy.		S26	125	11-14-18	32	18	12									
						126.5					51.6	25.3							
158.82	130		SILTY SAND (SM); dense; light grayish brown; fine to medium; some SILT. Laminated from 131.0 to 131.6 feet.		S27	130	15-15-24	39	18	18									
						131.5					40.6								
153.82	135		Poorly graded SAND with SILT (SP-SM); dense; light brownish gray; fine SAND; few fines.		S28	135	12-13-17	30	18	16									
						136.5					12.4	33.5							

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0016R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 7 of 9

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY N. Goodenow	BEGIN DATE Oct-26-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2138779.582 / E6338686.271 (National Grid)		HOLE ID S0016R
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING		SURFACE ELEVATION 288.82 ft (NAVD88)
DRILLING METHOD ROTARY(0'-160')			DRILL RIG Mobil B-80		BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 160 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
140			140.0' grades medium dense; frequent brown seams.	S29	140	12-10-14	24	18	14		9.7	32.7							
						141.5													
143.82	145		Poorly graded SAND (SP); medium dense; light grayish brown; fine; trace fines; rapid dilatancy; frequent brownish red partings; occasional black partings.	S30	145	15-11-16	27	18	17										
						146.5													
138.82	150		SILTY SAND (SM); medium dense; reddish brown to grayish brown; wet; medium; fine little fines; rapid dilatancy; few reddish brown oxidation seams.	S31	150	12-11-14	25	18	18		20.2	30.8							
						151.5													
133.82	155																		
128.82	160																		

(continued)

1.03 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0016R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 8 of 9	

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00	
LOGGED BY N. Goodenow	BEGIN DATE Oct-26-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2138779.582 / E6338686.271 (National Grid)	
DRILLING CONTRACTOR/DRILLER Gregg/D. McMacken			IN-SITU TESTING	SURFACE ELEVATION 288.82 ft (NAVD88)
DRILLING METHOD ROTARY(0'-160')			DRILL RIG Mobil B-80	BOREHOLE DIAMETER 6.25 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop	HAMMER EFFICIENCY, ERI 88%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER DURING DRILLING READINGS Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 160 ft	

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
160			Borehole terminated at a depth of 160.0' on 10/27/2011. Piezometer was installed down to 160.0'. The screen is located from 130.0 to 150.0'. No PS logging was performed for this borehole. Grouting was performed to the satisfaction of the City of Fresno grouting inspector.																
			For corrosion test results, see Appendix E.																
			Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.																
123.82	165		See Borehole Log Legend for soil classification chart and key to test data and sampler type.																
118.82	170																		
113.82	175																		
108.82	180																		



REPORT TITLE BORING RECORD				HOLE ID S0016R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 9 of 9

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-25-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2136102.464 / E6340038.382 (National Grid)		HOLE ID S0017R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 290.54 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 151.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		ASPHALT (4") (AC).		S01	0			60	60									Hand auger to 5.0'
			SILTY SAND (SM); brown; dry; fine to medium; subangular; some SILT; trace GRAVEL; weak cementation; [FILL].								43.3								Modified Proctor: Max $\gamma_d = 125.4$ pcf Optimum $W_L = 7.6\%$
285.54	5		SANDY SILT (ML); very stiff; grayish brown; moist to dry; some fine SAND; weak cementation; [ALLUVIUM].		S02	5	5-8-8	16	18	12									Set mud tub at 6.5'; 4.875" drag bit
						6.5					64.7								
280.54	10		10' Grades hard; grayish brown to brown; wet; some fine-medium SAND; weak to moderate cementation.		S03	10	50	50/3"	3	1									10.0'; driller notes hard material
						11.5													
275.54	15		SILT with SAND (ML); hard; grayish brown; wet; little SAND; trace medium to coarse SAND; low plasticity; weak cementation.		S04	15	18-17-15	32	18	15									15.0'; wood debris in cuttings
			Poorly graded SAND (SP); dense; grayish brown; wet; fine to medium; trace fines; weak cementation.			16.5					74.3								
270.54	20																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0017R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 1 of 8

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-25-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2136102.464 / E6340038.382 (National Grid)		HOLE ID S0017R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 290.54 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 151.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
20			SILTY CLAY with SAND (CL-ML); hard; grayish brown; wet; little medium to coarse SAND; weak cementation.	X	S05	20	12-22-37	59	18	14	72.1		21	4					
265.54	25		Poorly graded SAND with SILT (SP-SM); medium dense; grayish brown; wet; fine to medium; few SILT; weak cementation.	X	S06	25	10-13-16	29	18	12	13.5								
260.54	30		30' Grades to medium SAND.	X	S07	30	12-10-15	25	18	16	7.7								
255.54	35		35' Grades brown; fine-medium SAND.	X	S08	35	38-18-8	26	18	8									
250.54	40																		

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0017R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 2 of 8	



PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-25-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2136102.464 / E6340038.382 (National Grid)		HOLE ID S0017R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 290.54 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 151.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
40			SANDY SILT (ML); hard; grayish brown; wet; some fine SAND; low plasticity; weak cementation.	X	S09	40	9-12-18	30	18	8	62.4		22	3					
						41.5													
245.54	45		SILTY SAND (SM); dense; reddish brown; wet; fine to medium; some SILT; trace coarse SAND; weak cementation.	X	S10	45	18-18-23	41	18	12	31.6								
						46.5													
240.54	50		50' Grades very dense; grayish brown with reddish brown mottling; fine.	X	S11	50	50	50/6"	6	6	46.2								
						51.5													
235.54	55		55' Grades to reddish brown; fine to medium; little SILT.	X	S12	55	27-27-27	54	18	8	22.3								
						56.5													
230.54	60																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0017R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 3 of 8

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-25-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2136102.464 / E6340038.382 (National Grid)		HOLE ID S0017R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 290.54 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 151.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
60			60' Grades dense; some fines.	X	S13	60	13-15-17	32	18	14	30.2								
						61.5													
225.54	65		65' Grades very dense; grayish brown; fine to medium.	X	S14	65	25-31-41	72	18	10									
						66.5													
220.54	70		SANDY SILT (ML); hard; grayish brown; wet; some fine SAND; weak cementation.	X	S15	70	17-22-22	44	18	12	61.7								
						71.5													
215.54	75		SILTY SAND (SM); very dense; reddish brown; wet; fine to medium; some SILT; weak cementation.	X	S16	75	30-31-50	81/11"	17	17	45.1								
			75.8' Grades to grayish brown with seams of reddish brown 1/16" to 1/8" long and variegated white.			76.5													
210.54	80																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0017R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 4 of 8	

1.03 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-25-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2136102.464 / E6340038.382 (National Grid)		HOLE ID S0017R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 290.54 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 151.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
80			LEAN CLAY (CL); hard; grayish brown; wet; few fine to medium SAND; low plasticity; weak cementation.		S17	80	9-12-19	31	18	18	85.1		27	4					
			SANDY SILT (ML); hard; grayish brown; wet; some fine to medium SAND; weak cementation.			81.5					56								
			80.9', grades to little fine to medium SAND.																
205.54	85		SILTY SAND (SM); dense; grayish brown; wet; fine to medium; little SILT; weak cementation.		S18	85	14-20-25	45	18	15	17.7								
			SANDY SILT (ML); hard; brown; wet; some fine to medium SAND; weak cementation.			86.5					51.7								
200.54	90		SILTY SAND (SM); very dense; reddish brown; wet; fine to coarse; some SILT; weak cementation.		S19	90	37-50	50/5.5"	12	12	36.2								
						91.5													
195.54	95		SANDY CLAY (CL); hard; grayish brown with reddish brown layers; wet; some fine to coarse SAND; medium plasticity; weak cementation.		S20	95	34-50	50/3"	9	9	59.3								
						96.5													
190.54	100																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0017R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 5 of 8

1.03 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-25-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2136102.464 / E6340038.382 (National Grid)		HOLE ID S0017R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 290.54 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 151.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	100		CLAYEY SAND (SC); very dense; grayish brown; wet; fine to medium; weak cementation.		S21	100	38-50	50/	12	11									
						101.5					43.1								
185.54	105		SANDY SILT (ML); hard; grayish brown with reddish brown mottling; wet; fine to coarse; weak cementation.		S22	105	17-23-27	50	18	17									
						106.5					58.3								
180.54	110		Poorly graded SAND (SP); dense; brown; wet; medium; trace fines; weak cementation.		S23	110	19-14-20	34	18	17									
						111.5													
175.54	115		SILTY SAND (SM); dense; brown; wet; fine to medium; little SILT; weak cementation.		S24	115	12-24-25	49	18	16									
			116' Grades fine.			116.5					26.4								

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0017R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 6 of 8	

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-25-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2136102.464 / E6340038.382 (National Grid)		HOLE ID S0017R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 290.54 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 151.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
120			CLAY with SAND (CL); hard; brown; wet; few fine SAND; trace medium SAND; medium plasticity; weak cementation.	X	S25	120	17-50	50/3"	12	12									
						121.5					76.4		27	10					
165.54	125		Poorly graded SAND (SP); dense; brown; wet; fine to medium; trace fines; weak cementation. 125.4' Grades to grayish brown.	X	S26	125	16-22-23	45	18	10									
						126.5													
160.54	130		130' Grades medium.	X	S27	130	20-20-27	47	18	9									
						131.5													
155.54	135		135' Grades very dense; fine. 135.5' Grades to medium.	X	S28	135	25-30-38	68	18	9									
						136.5													

(continued)

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0017R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 7 of 8

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-25-11	COMPLETION DATE Oct-27-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2136102.464 / E6340038.382 (National Grid)		HOLE ID S0017R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 290.54 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-151.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Piezometer			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 151.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
140			SILT with SAND (ML); hard; brown; wet; little fine to medium SAND; medium plasticity; weak cementation.		S29	140	18-16-17	33	18	18	70.9		40	14					
			Poorly graded SAND (SP); dense; brown; wet; fine to medium; trace fines; weak cementation.			141.5													
145.54	145		Poorly graded SAND with SILT (SP-SM); dense; brown; wet; fine to medium; few SILT; weak cementation. 144.5', grades to coarse.		S30	145	14-18-23	41	18	12	73.3								
			SILT with SAND (ML); hard; brown; wet; few fine to medium SAND; weak cementation.			146.5													
140.54	150		SANDY SILT (ML); hard; grayish brown with brown mottling; wet; some fine SAND; weak cementation.		S31	150	13-27-25	52	18	18	58.9								
						151.5													
Borehole terminated at a depth of 151.5' on 10/27/2011.																			
For corrosion test results, see Appendix E.																			
Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.																			
See Borehole Log Legend for soil classification chart and key to test data and sampler type.																			

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12



REPORT TITLE BORING RECORD				HOLE ID S0017R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 8 of 8

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-27-11	COMPLETION DATE Oct-28-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2134428.022 / E6340369.116 (National Grid)		HOLE ID S0018R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 305.75 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-165')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 165 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		ASPHALT (8") (AC).		S01	0			60	60									
			SILTY SAND (SM); brown; moist to dry; fine to medium; trace fines; subangular GRAVEL; weak cementation; [FILL].								40.1								Modified Proctor: Max $\gamma_d = 127.4$ pcf Optimum $W_L = 8.6\%$
300.75	5		SANDY SILTY CLAY (CL-ML); hard; brown with grayish brown mottling; some fine SAND; low plasticity; weak cementation; [ALLUVIUM].		S02	5	12-15-16	31	18	18	54.8	10.1							Mud rotary set up at 6.5'; 4.875" drag bit
						6.5													
295.75	10		SILTY SAND (SM); dense; grayish brown interbedded with reddish brown; some SILT; trace fine GRAVEL.		S03	10	16-23-22	45	18	14	43.5	14.4							
						11.5													
290.75	15				S04	15	19-20-17	37	18	15	48.8	11.8							
						16.5													
285.75	20																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0018R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 1 of 9

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-27-11	COMPLETION DATE Oct-28-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2134428.022 / E6340369.116 (National Grid)		HOLE ID S0018R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 305.75 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-165')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		20.0', grades medium dense; brown.		S05	20	4-6-9	15	18	12	38	13.1							
						21.5													
280.75	25		SILTY CLAY with SAND (CL-ML); hard; brown interbedded with grayish brown with reddish brown mottling; wet; little SAND; low plasticity.		S06	25	8-13-18	31	18	14	76.9	24.9	22	4					
						26.5													
275.75	30		SILTY SAND (SM); medium dense; reddish brown; wet; fine to medium; some SILT.		S07	30	10-12-13	25	18	14	25.3								
						31.5													
270.75	35		Poorly graded SAND with SILT (SP-SM); very dense; brown; wet; fine; few SILT.		S08	35	26-27-27	54	18	15	13.4								
			35.6', grades to grayish brown; fine to medium.			36.5													

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0018R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 2 of 9

1.0.3 BOREHOLE LOG - CHSTP F-B CHSR F-B.GPJ ARUP DOTR LIBRARY.GLB 2/20/12

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-27-11	COMPLETION DATE Oct-28-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2134428.022 / E6340369.116 (National Grid)		HOLE ID S0018R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 305.75 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-165')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	40		40.0', grades medium dense; few SILT.		S09	40	8-12-13	25	18	13									
						41.5					7.1	18.1							
260.75	45		45.0', grades very dense.		S10	45	18-34-47	81	18	10									
						46.5					9.5	12.4							
255.75	50		SANDY SILT (ML); dense; grayish brown; wet; little fine SAND; weak cementation.		S11	50	13-16-19	35	18	13									
			Poorly graded SAND (SP); dense; grayish brown; wet; fine to medium; trace SILT; weak cementation.			51.5					83.1								
250.75	55		Poorly graded SAND with SILT (SP-SM); dense; grayish brown; wet; fine to medium; few SILT; weak cementation.		S12	55	14-18-19	37	18	8									
						56.5					11.1								
245.75	60																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0018R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 3 of 9

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-27-11	COMPLETION DATE Oct-28-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2134428.022 / E6340369.116 (National Grid)		HOLE ID S0018R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 305.75 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-165')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
60			SILTY SAND (SM); very dense; reddish brown; wet; fine; some SILT; weak cementation.	X	S13	60	29-50	50/5.5"	12	9	39	15.1							
						61.5													
240.75	65		Poorly graded SAND with SILT (SP-SM); very dense; grayish brown; wet; fine to medium; few SILT; weak cementation.	X	S14	65	15-22-50	72/11.5"	18	8	11.1	12.4							
						66.5													
235.75	70		SILTY SAND (SM); very dense; reddish brown; wet; fine; little SILT; weak cementation.	X	S15	70	20-22-34	56	18	14	22.2	12.9							
						71.5													
230.75	75		75.0', grades dense; brown; fine; some SILT.	X	S16	75	13-17-21	38	18	17	32.9	13.5							
						76.5													
225.75	80																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0018R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 4 of 9	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-27-11	COMPLETION DATE Oct-28-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2134428.022 / E6340369.116 (National Grid)		HOLE ID S0018R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 305.75 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-165')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 165 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
80			Poorly graded SAND with SILT (SP-SM); dense; grayish brown; wet; medium; few SILT; weak cementation.		S17	80	18-22-25	47	18	14	9.4	16.7							
						81.5													
220.75	85		SANDY SILT (ML); hard; grayish brown; wet; some fine SAND; weak cementation.		S18	85	21-34-35	69	18	16	53.3	20.4							
						86.5													
215.75	90		SILT with SAND (ML); hard; brown; wet; little fine SAND; weak cementation.		S19	90	19-27-37	64	18	14	84.9	30.2							
			SANDY SILT (ML); hard; brown with reddish brown mottling; wet; some fine SAND; weak cementation.			91.5					69.5	27.1							
210.75	95		SILTY SAND (SM); very dense; brown; wet; fine to medium; little SILT.		S20	95	24-31-43	74	18	12	23.8	13.5							
						96.5													
205.75	100																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0018R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 5 of 9	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00	
LOGGED BY A. Poling	BEGIN DATE Oct-27-11	COMPLETION DATE Oct-28-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2134428.022 / E6340369.116 (National Grid)	
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer	
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-165')			DRILL RIG Failing 1500	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop	
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER DURING DRILLING READINGS	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 165 ft	

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
100			100.0', grades trace organic material.	X	S21	100	36-50	50/ 5"	11	11		27.8	16.9		2.1				
						101.5													
200.75	105		105.0', grades fine; some SILT.	X	S22	105	22-25-32	57	18	12		37							
						106.5													
195.75	110		110.0', grades to grayish brown.	X	S23	110	43-37-50	87/ 10.5"	17	14		38.1	17						
						111.5													
190.75	115			X	S24	115	21-27-27	54	18	7									
						116.5													

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0018R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 6 of 9

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-27-11	COMPLETION DATE Oct-28-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2134428.022 / E6340369.116 (National Grid)		HOLE ID S0018R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 305.75 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-165')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 165 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
120			SANDY SILT (ML); hard; grayish brown with reddish brown mottling; wet; some fine SAND; weak cementation.	X	S25	120	8-16-40	56	18	10	57.4								
						121.5													
180.75	125		SILTY SAND (SM); very dense; grayish brown; wet; medium; few SILT; weak cementation.	X	S26	125	23-30-42	72	18	9	16.6								
						126.5													
175.75	130		130' Grades fine. 130.2' Grades fine to medium.	X	S27	130	21-30-40	70	18	11	23.8	21.5							
						131.5													
170.75	135		SANDY SILT (ML); hard; grayish brown; wet; some fine to medium SAND; weak cementation.	X	S28	135	35-50	50/4"	10	10	61.3	19.9							
						136.5													

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0018R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 7 of 9	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-27-11	COMPLETION DATE Oct-28-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2134428.022 / E6340369.116 (National Grid)		HOLE ID S0018R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 305.75 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-165')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 165 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
140			SILTY SAND (SM); dense; brown; wet; fine to medium; some SILT; weak cementation.		S29	140	12-17-21	38	18	16									
						141.5					42.1								
			SILT (ML); hard; grayish brown; wet; few SAND; weak cementation.								85.1								
160.75	145		SILTY SAND (SM); dense; grayish brown; wet; fine; some SILT; weak cementation.		S30	145	14-20-24	44	18	12									
						146.5					49.3	22.1							
155.75	150		150.0', grades fine to medium-fine; little SILT.		S31	150	20-25-28	53	18	12									
						151.5					17.1	23.9							
150.75	155																		
145.75	160																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0018R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 8 of 9	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY A. Poling	BEGIN DATE Oct-27-11	COMPLETION DATE Oct-28-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2134428.022 / E6340369.116 (National Grid)		HOLE ID S0018R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Stewart			IN-SITU TESTING Standpipe piezometer		SURFACE ELEVATION 305.75 ft (NAVD88)
DRILLING METHOD AUGER(0'-6.5'), ROTARY(6.5'-165')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 4.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 165 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
160																			
140.75	165																		
135.75	170																		
130.75	175																		
125.75	180																		

Borehole terminated at a depth of 165.0' on 10/27/2011.

For corrosion test results, see Appendix E.

Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.

See Borehole Log Legend for soil classification chart and key to test data and sampler type.



REPORT TITLE BORING RECORD				HOLE ID S0018R	
DIST.	COUNTY	ROUTE	POSTMILE	EA	
PROJECT OR BRIDGE NAME California High-Speed Train					
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 9 of 9

PROJECT NAME California High-Speed Train Fresno to Bakersfield				PROJECT NUMBER 131577-00	
LOGGED BY Trent Cohen	BEGIN DATE Oct-21-11	COMPLETION DATE Oct-21-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2125513.18 / E6341547.865 (National Grid)		HOLE ID S0019R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			IN-SITU TESTING		SURFACE ELEVATION 292.53 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-51.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 3.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
					TOTAL DEPTH OF BORING 51.5 ft

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method Casing Depth	Remarks/ Other Tests
	0		SILTY SAND (SM); medium dense; light brown; moist; fine; some SILT; weak cementation; [ALLUVIUM].	S01	0			60	60								No asphalt
	5				5					38.3							
287.53				S02	5	4-8-11	19	18	18								
			SANDY SILT (ML); very stiff; gray; moist; some fine SAND; low plasticity; weak to moderate cementation.		6.5					39.5	4.6						
			SILTY SAND (SM); medium dense; brown with gray seams; moist; fine; some SILT; weak cementation.	S03	6.5	9-11-12	23	18	18	64.4		23	2				
					8					43.3	4.5						
			SILTY SAND (ML); medium dense; grayish brown with reddish brown staining; moist; fine; some fines; weak cementation.	S04	8	2-5-7	12	18	12								
			Poorly graded SAND (SP); medium dense; brown with gray seams; wet; fine; trace fines; weak cementation.		9.5												
282.53	10		SILT (ML); stiff; grayish brown with reddish brown staining; wet; few SAND; low plasticity; weak cementation.	S05	9.5	6-6-6	12	18	15	88.1	17.9	23	3				
					11					53.7	25.6						
			SANDY SILT (ML); stiff; brown with reddish brown staining; wet; some fine SAND; weak cementation.	S06	11	4-6-6	12	18	14								
			Poorly graded SAND with SILT (SP-SM); medium dense; brown with reddish brown staining; wet; few SILT; weak cementation; micaceous.		12.5												
				S07	12.5	6-6-6	12	18	15								
					14					11.9							
277.53	15		Poorly graded SAND (SP); loose; grayish brown with dark gray seams; wet; fine to medium; trace fines; weak cementation.	S08	14	4-4-4	8	18	14	2.8	24.1						
					15.5												

(continued)

REPORT TITLE BORING RECORD				HOLE ID S0019R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran		DATE 2-20-12	SHEET 1 of 3



PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00		
LOGGED BY Trent Cohen	BEGIN DATE Oct-21-11	COMPLETION DATE Oct-21-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2125513.18 / E6341547.865 (National Grid)		HOLE ID S0019R
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			IN-SITU TESTING		SURFACE ELEVATION 292.53 ft (NAVD88)
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-51.5')			DRILL RIG Failing 1500		BOREHOLE DIAMETER 3.875 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop		HAMMER EFFICIENCY, ERI 68%
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS	DURING DRILLING Not Recorded	AFTER DRILLING (DATE) Not Recorded
			TOTAL DEPTH OF BORING 51.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	20		SILTY SAND (SM); medium dense; brown; wet; fine; little SILT; weak cementation.		S09	20	14-11-9	20	18	16									
						21.5					22.3	12.3							
267.53	25		Poorly graded SAND with SILT (SP-SM); medium dense; grayish brown with dark gray seams; wet; fine; trace fines; weak cementation.		S10	25.5	6-8-9	17	18	14									
						27					5	20.5							
262.53	30		Poorly graded SAND with SILT (SP-SM); medium dense; grayish brown with dark gray seams; wet; medium; few SILT; weak cementation.		S11	30	8-10-26	36	18	15									
			31.1', 2" layer; light gray; weak to medium cementation.			31.5					6.3	23.4							
257.53	35		SILT with SAND (ML); hard; brown with reddish brown staining; wet; few fine SAND; weak cementation.		S12	35	19-18-18	36	18	17									
			SILTY SAND (SM); dense; brown with reddish brown staining; wet; fine; some SILT; weak to moderate cementation.			36.5					76.9								
											38.6								
					S13	39	11-15-16	31	18	10									
252.53	40																		

(continued)



REPORT TITLE BORING RECORD				HOLE ID S0019R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER	PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 2 of 3	

PROJECT NAME California High-Speed Train Fresno to Bakersfield			PROJECT NUMBER 131577-00	
LOGGED BY Trent Cohen	BEGIN DATE Oct-21-11	COMPLETION DATE Oct-21-11	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2125513.18 / E6341547.865 (National Grid)	
DRILLING CONTRACTOR/DRILLER Pitcher/W. Baker			HOLE ID S0019R	
DRILLING METHOD AUGER(0'-5'), ROTARY(5'-51.5')			SURFACE ELEVATION 292.53 ft (NAVD88)	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT(1-3/8")			BOREHOLE DIAMETER 3.875 in	
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			HAMMER EFFICIENCY, ERI 68%	
			TOTAL DEPTH OF BORING 51.5 ft	
			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS Not Recorded Not Recorded	

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sample Number	Sample Depth (ft)	Blows per 6 in.	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Organics (%)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	40		SANDY SILT (ML); hard; brown with reddish staining; wet; some fine SAND.			41.5					58.5	23.2							
247.53	45		Poorly graded SAND with SILT (SP-SM); medium dense; grayish brown with reddish brown staining; wet; fine; few SILT; weak cementation.	S14	45	11-12-14	26	18	16		9.3	15.7							
						46.5													
242.53	50		50.0', fine to medium.	S15	50	14-13-16	29	18	15										
						51.5													
Borehole terminated at a depth of 51.5' on 10/21/2011.																			
For corrosion test results, see Appendix E.																			
Soil moisture indicated as "wet" because SPT samples became wet during retrieval through rotary method drilling fluid. Soil moisture indication should not be used as an indication of a potential phreatic surface or free groundwater table.																			
See Borehole Log Legend for soil classification chart and key to test data and sampler type.																			
237.53	55																		
232.53	60																		



REPORT TITLE BORING RECORD				HOLE ID S0019R
DIST.	COUNTY	ROUTE	POSTMILE	EA
PROJECT OR BRIDGE NAME California High-Speed Train				
BRIDGE NUMBER		PREPARED BY D. Maggi/T. Curran	DATE 2-20-12	SHEET 3 of 3

Appendix C

Cone Penetration Test Records

Table C-1
Summary of CPT Locations, Depths, and In Situ Testing

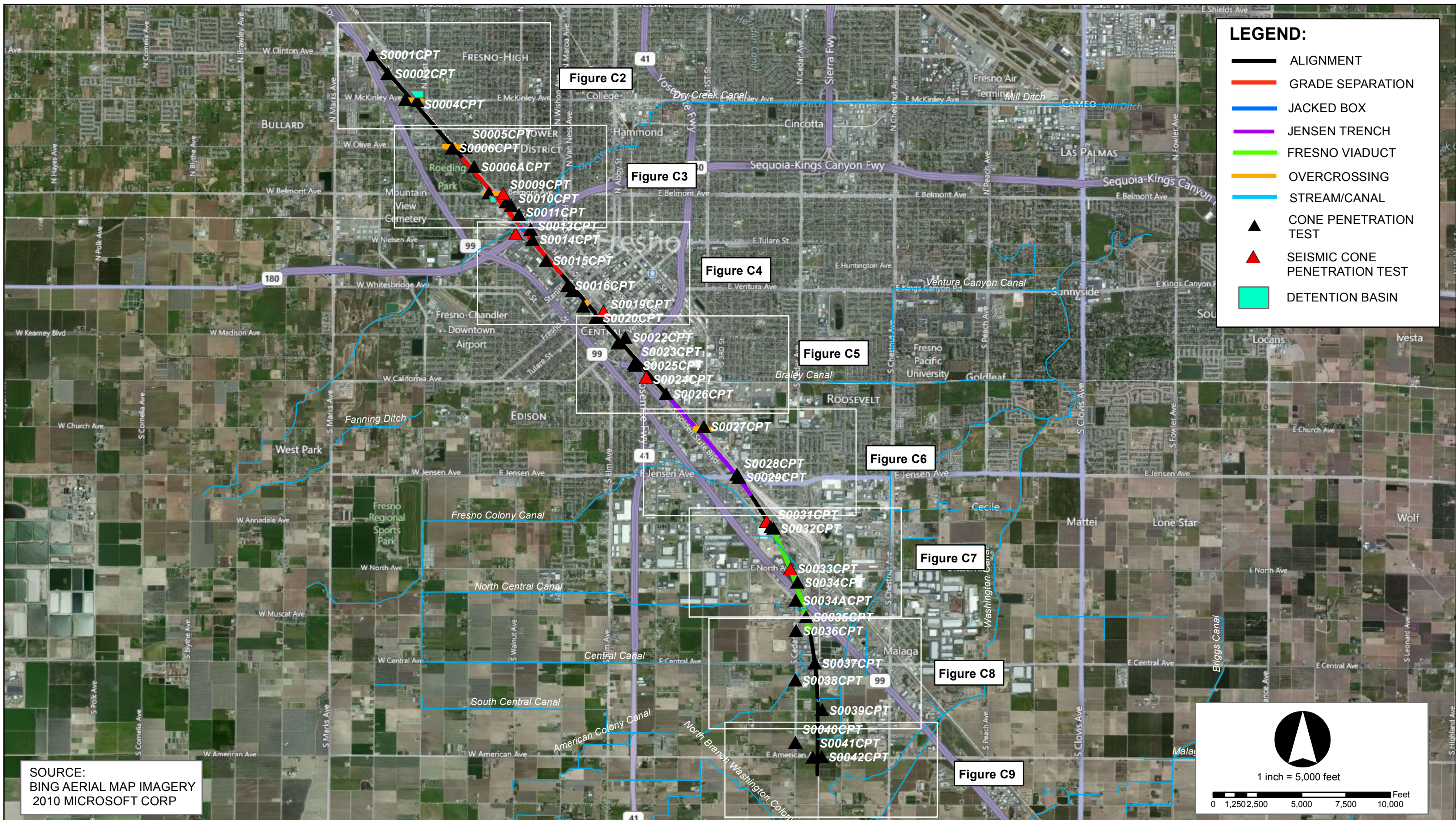
CPT ID	Elevation (NAVD88) (ft)	Northing (NAD83) (ft)	Easting (NAD83) (ft)	Hand-Auger/Pre-Drill Depths (ft)	Measured Depth to (ft)	Total Depth (ft)	In Situ Testing	
							SCPT ^[1]	PPDT ^[2]
S0001CPT	2,165,095	6,316,493	296.60	0 to 5	-	80.2		✓
S0002CPT	2,164,037	6,317,351	293.70	0 to 5; 6 to 9	-	50.0		
S0003CPT	2,162,577	6,318,313	287.50	0 to 5	-	80.2		
S0004CPT	2,162,522	6,318,980	289.20	0 to 4.5	-	80.7		
S0005CPT	2,159,881	6,321,692	292.50	0 to 5	-	80.0		✓
S0006CPT	2,159,855	6,320,967	295.10	0 to 15	-	80.1		✓
S0006ACPT	2,158,797	6,322,193	290.10	0 to 5	-	52.5		
S0007CPT	2,157,330	6,323,012	287.10	0 to 5	-	76.4		
S0008CPT	2,156,854	6,324,017	285.30	0 to 5.5; 29 to 36	-	100.2		✓
S0009CPT	2,157,307	6,323,848	286.80	0 to 4.5	-	105.8	✓	✓
S0010CPT	2,156,609	6,324,306	283.40	0 to 4	-	59.2		
S0011CPT	2,156,092	6,324,747	284.40	0 to 6	-	66.6		
S0012CPT	2,155,038	6,324,548	288.90	0 to 4.5	-	102.7	✓	✓
S0013CPT	2,155,267	6,325,407	285.10	0 to 4.5; 9 to 11; 14 to 24	-	101.2		
S0014CPT	2,154,687	6,325,494	287.60	0 to 5	-	52.2		
S0015CPT	2,153,499	6,326,261	286.10	0 to 5	-	114.7		
S0016CPT	2,152,083	6,327,476	285.40	0 to 5	-	67.3		✓
S0017CPT	2,151,787	6,327,731	286.30	0 to 5	-	80.4		
S0018CPT	2,150,922	6,328,346	286.00	0 to 5	-	80.4		
S0019CPT	2,150,638	6,329,493	289.10	0 to 5	-	81.5	✓	
S0020CPT	2,150,349	6,329,144	289.00	0 to 5	-	80.1		
S0021CPT	2,148,902	6,330,415	292.60	0 to 5	-	80.4		
S0022CPT	2,149,159	6,330,712	293.00	0 to 5	-	80.1		✓
S0023CPT	2,165,095	6,316,493	285.00	0 to 5	94.5	150.6		✓
S0024CPT	2,164,037	6,317,351	284.70	0 to 5	95.0	103.8	✓	✓
S0025CPT	2,162,577	6,318,313	284.70	0 to 5	-	150.6		✓
S0026CPT	2,162,522	6,318,980	283.80	0 to 5	-	64.0		
S0027CPT	2,159,881	6,321,692	286.60	0 to 5	-	80.4		
S0028CPT	2,159,855	6,320,967	286.80	0 to 5	-	45.1		
S0029CPT	2,158,797	6,322,193	287.90	0 to 5	-	80.0		✓
S0030CPT	2,157,330	6,323,012	288.90	0 to 5	-	64.1	✓	
S0031CPT	2,156,854	6,324,017	289.30	0 to 5.5	-	150.4		✓
S0032CPT	2,157,307	6,323,848	290.10	0 to 4.5	-	90.7		✓
S0033CPT	2,156,609	6,324,306	290.50	0 to 15	-	75.1	✓	
S0034CPT	2,156,092	6,324,747	297.00	0 to 5	-	84.0		
S0034ACPT	2,155,038	6,324,548	303.70	0 to 5	-	95.1	✓	✓

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

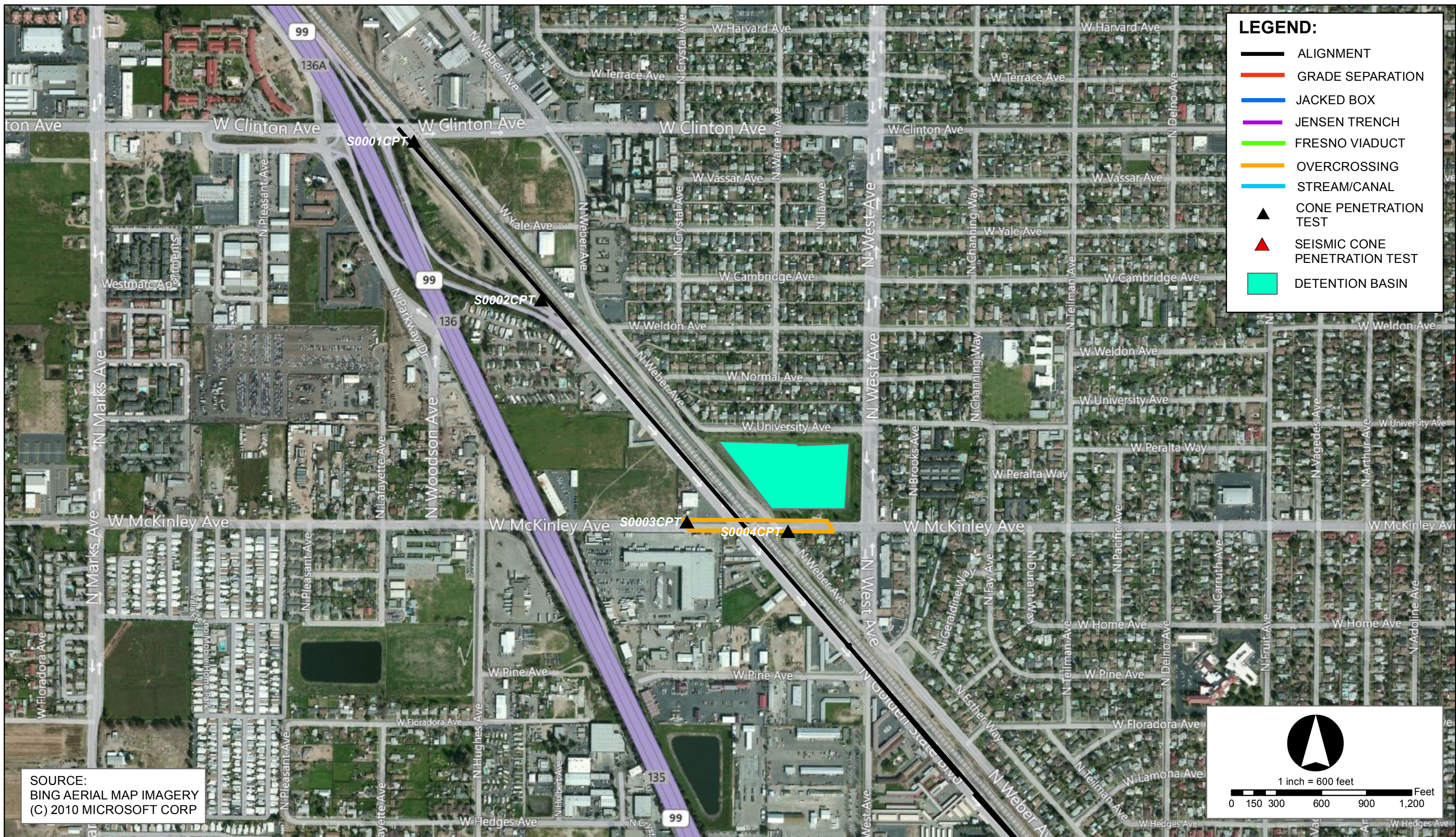
Table C-1
Summary of CPT Locations, Depths, and In Situ Testing

CPT ID	Elevation (NAVD88) (ft)	Northing (NAD83) (ft)	Easting (NAD83) (ft)	Hand-Auger/Pre-Drill Depths (ft)	Measured Depth to (ft)	Total Depth (ft)	In Situ Testing	
							SCPT ^[1]	PPDT ^[2]
S0035CPT	2,155,267	6,325,407	289.20	0 to 5	61.0	100.2		✓
S0036CPT	2,154,687	6,325,494	288.00	0 to 5; 13 to 22	96.0	100.2		✓
S0037CPT	2,153,499	6,326,261	289.30	0 to 5	31.0	80.0		✓
S0038CPT	2,152,083	6,327,476	287.30	0 to 5	-	50.2		
S0039CPT	2,151,787	6,327,731	290.40	0 to 5	-	50.3		
S0040CPT	2,150,922	6,328,346	289.20	0 to 5	-	55.6		
S0041CPT	2,150,638	6,329,493	293.10	0 to 5	60.9	80.2		✓
S0042CPT	2,150,349	6,329,144	291.50	0 to 5	66.0	80.0		
^[1] SCPT: seismic cone penetration test								
^[2] PPDT: pore pressure dissipation test								

06/29/2012 ADDENDUM 3 - RFP HSR 11-16



06/29/2012 ADDENDUM 3 - RFP HSR 11-16

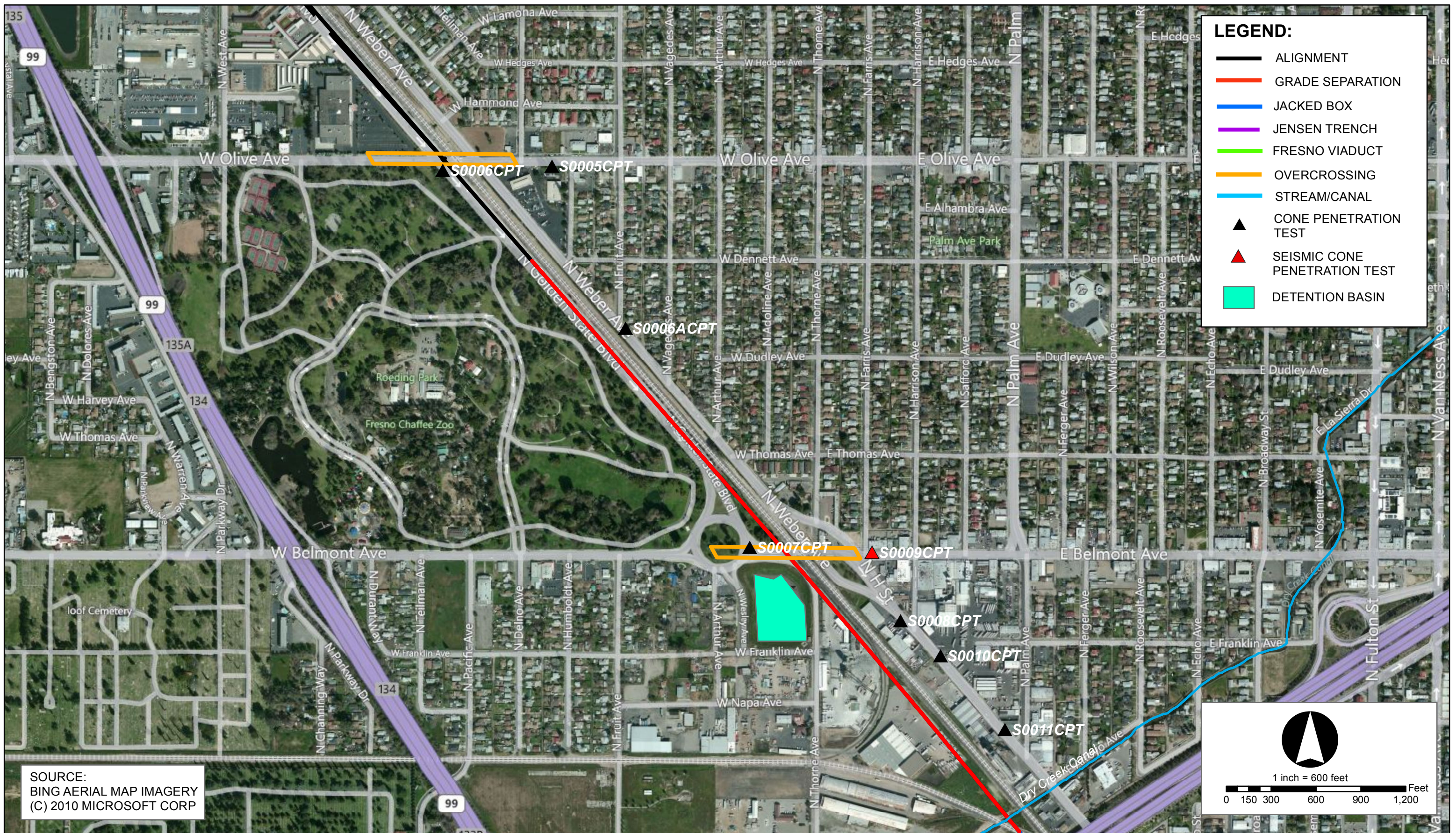


SOURCE:
BING AERIAL MAP IMAGERY
(C) 2010 MICROSOFT CORP



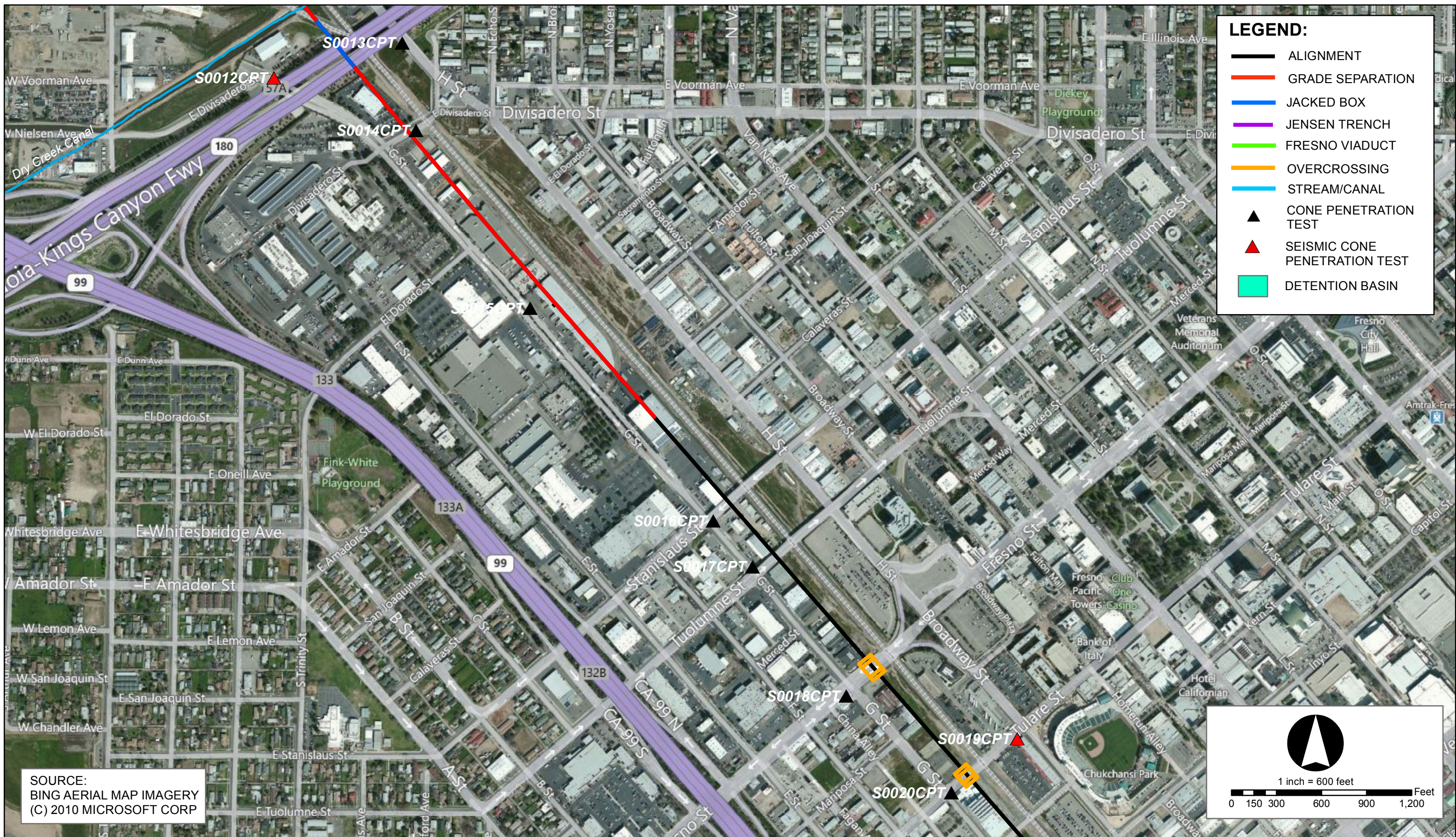
CONE PENETRATION TEST INDEX SHEET
California High Speed Train
Fresno to Bakersfield
Geotechnical Data Report - Package 1

Figure No. C2
February 2012



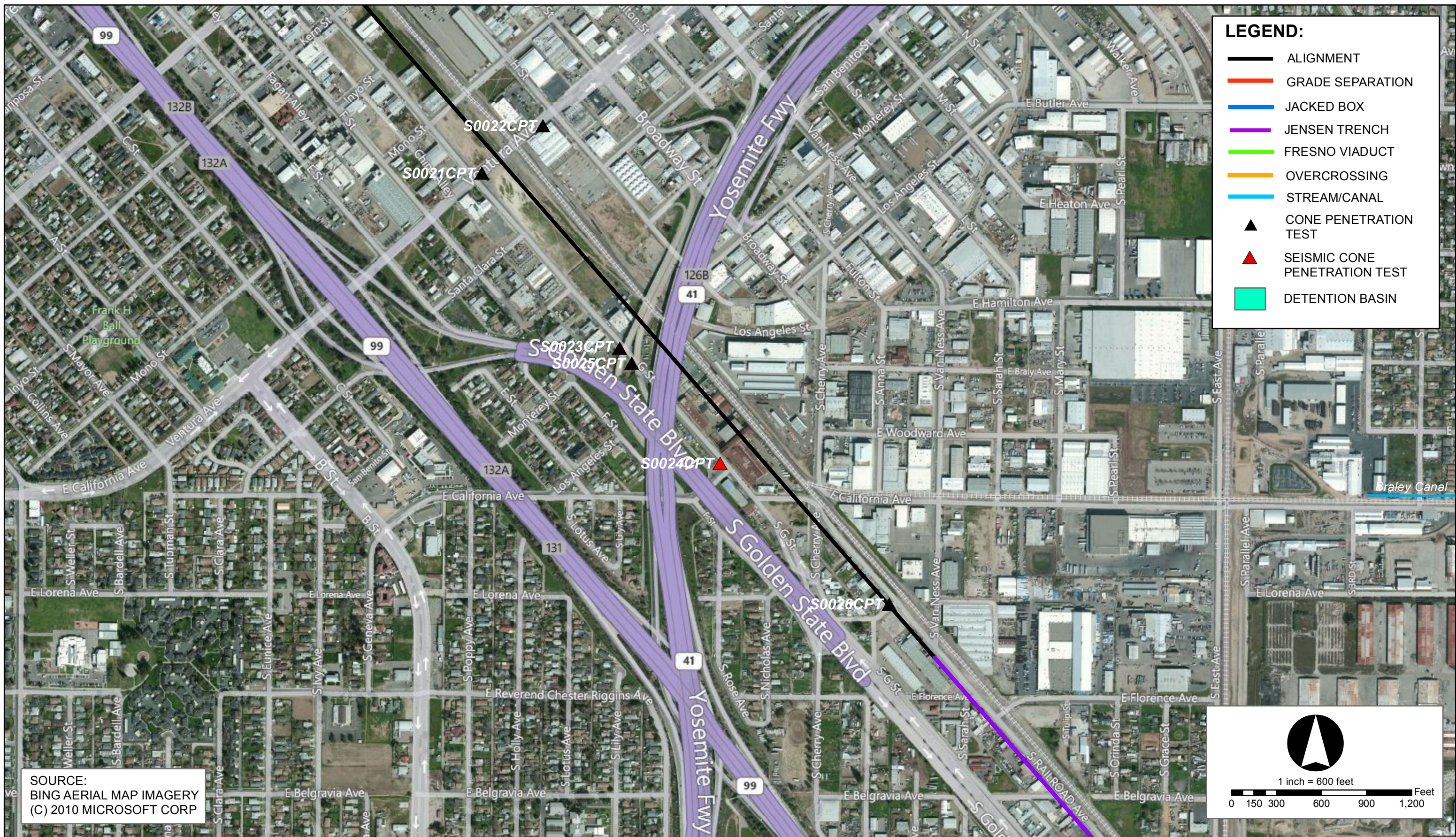
CONE PENETRATION TEST LOCATION MAP
California High Speed Train
Fresno to Bakersfield
Geotechnical Data Report - Package 1

Figure No. C3
 February 2012



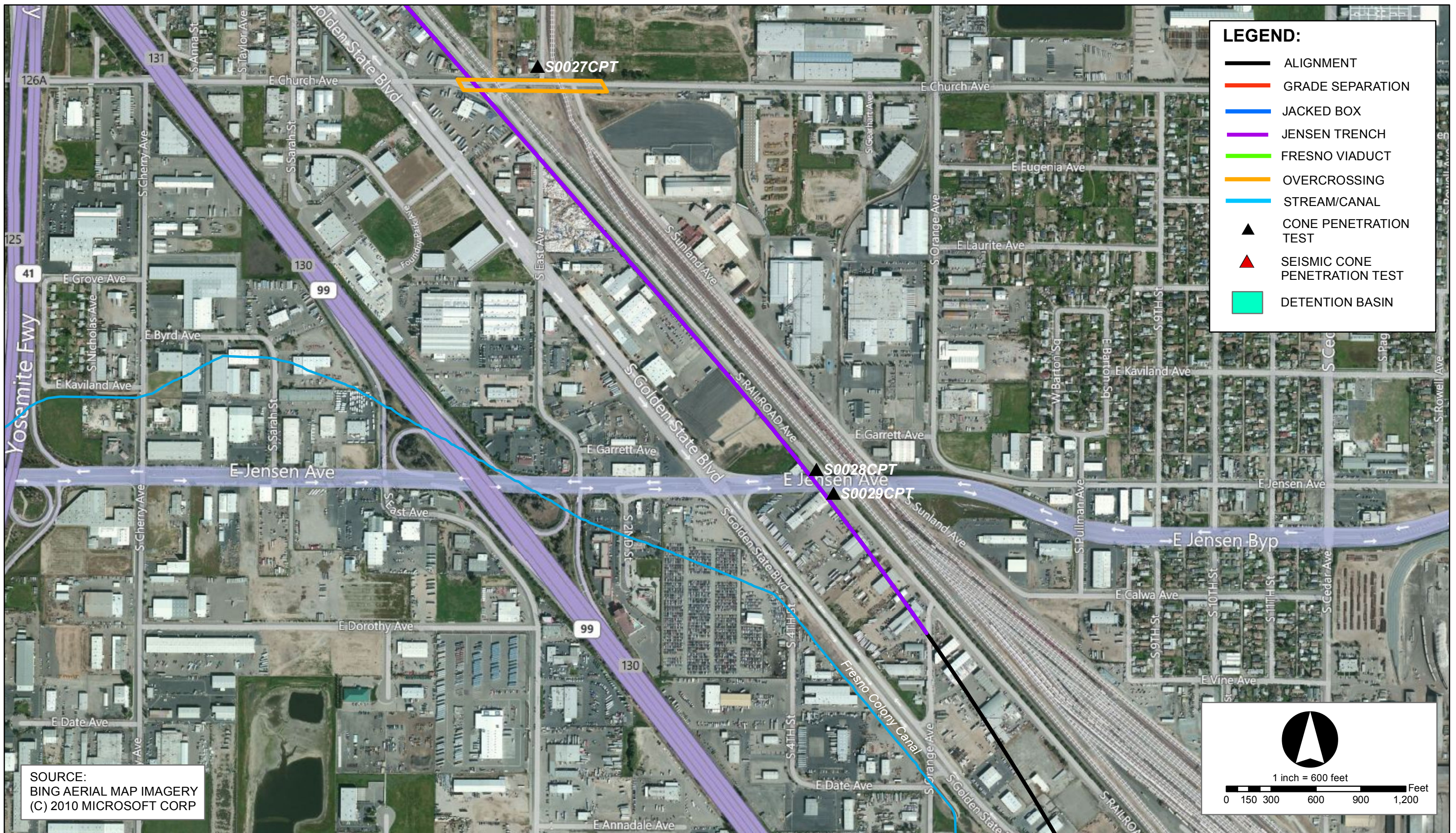
CONE PENETRATION TEST LOCATION MAP
California High Speed Train
Fresno to Bakersfield
Geotechnical Data Report - Package 1

Figure No. C4
February 2012



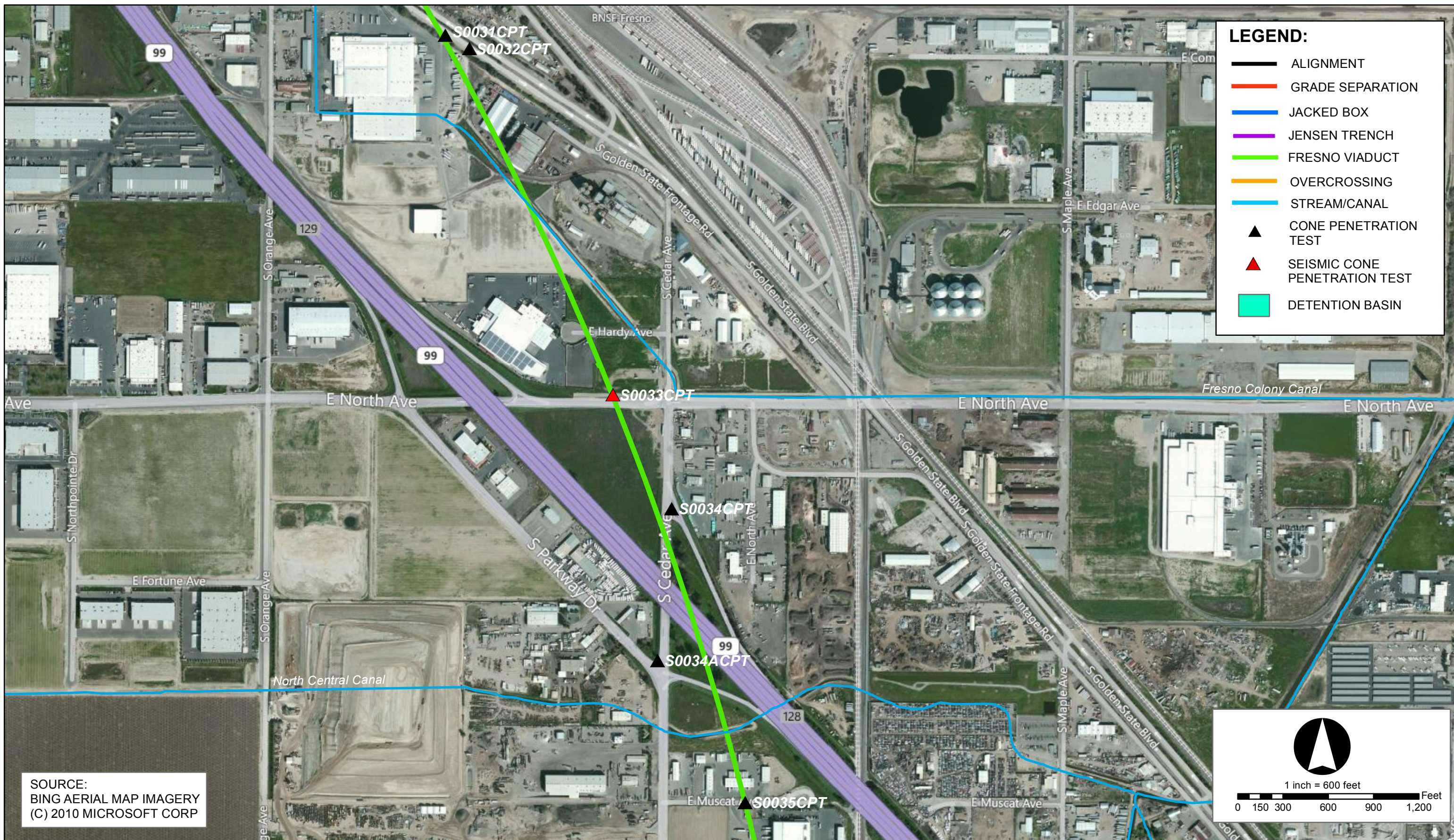
CONE PENETRATION TEST LOCATION MAP
California High Speed Train
Fresno to Bakersfield
Geotechnical Data Report - Package 1

Figure No. C5
February 2012

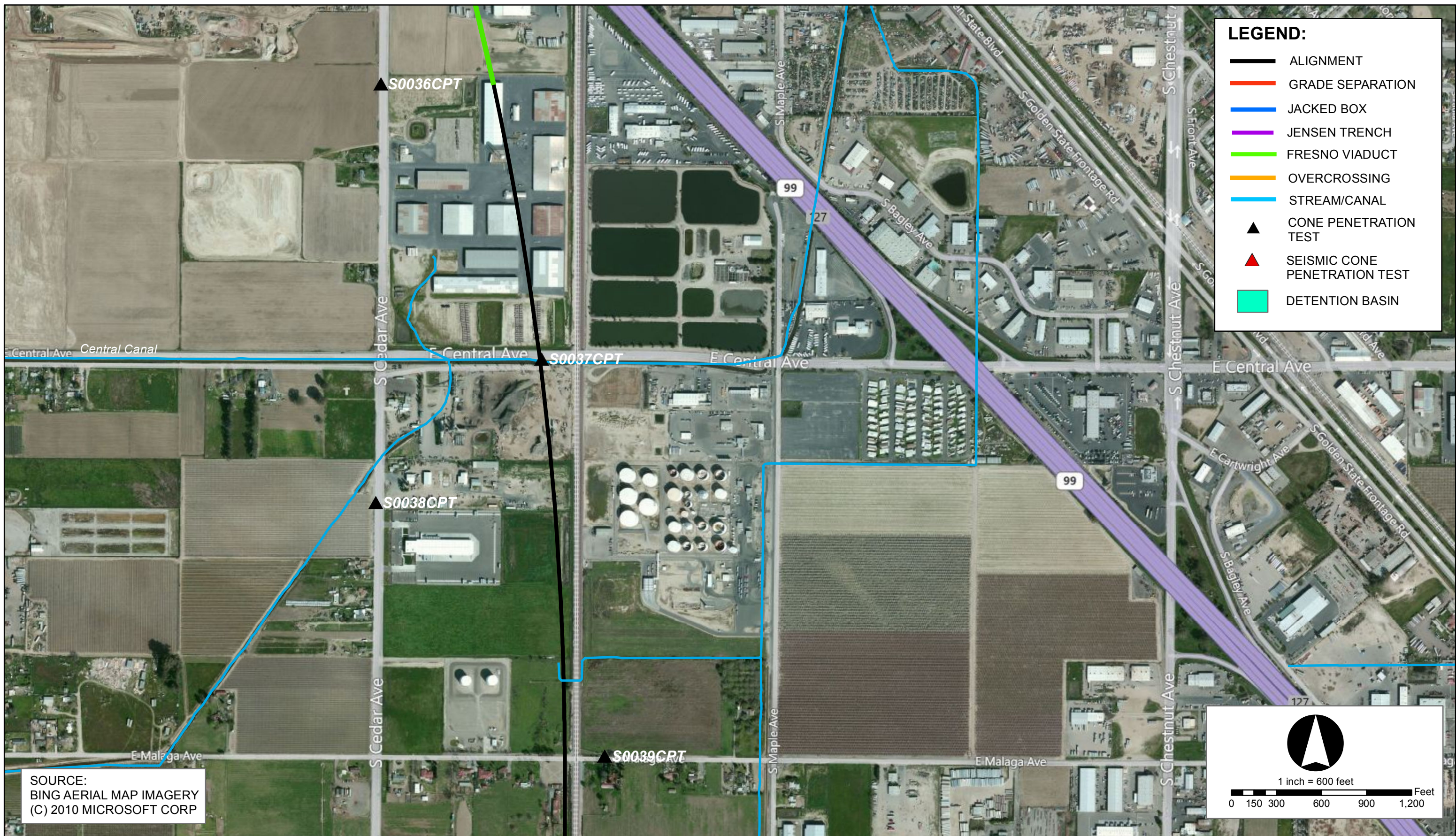


CONE PENETRATION TEST LOCATION MAP
California High Speed Train
Fresno to Bakersfield
Geotechnical Data Report - Package 1

Figure No. C6
 February 2012

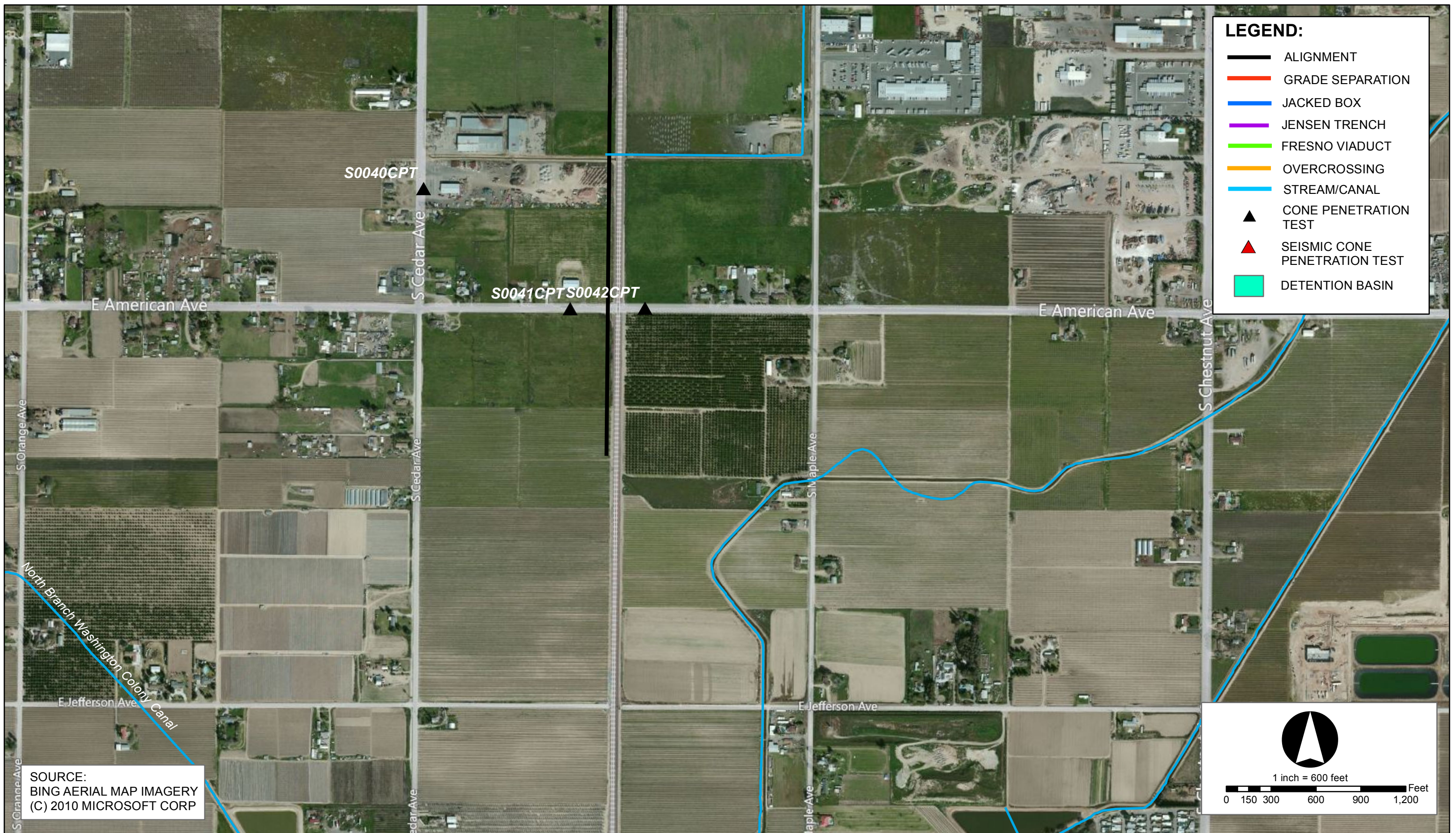


SOURCE:
BING AERIAL MAP IMAGERY
(C) 2010 MICROSOFT CORP

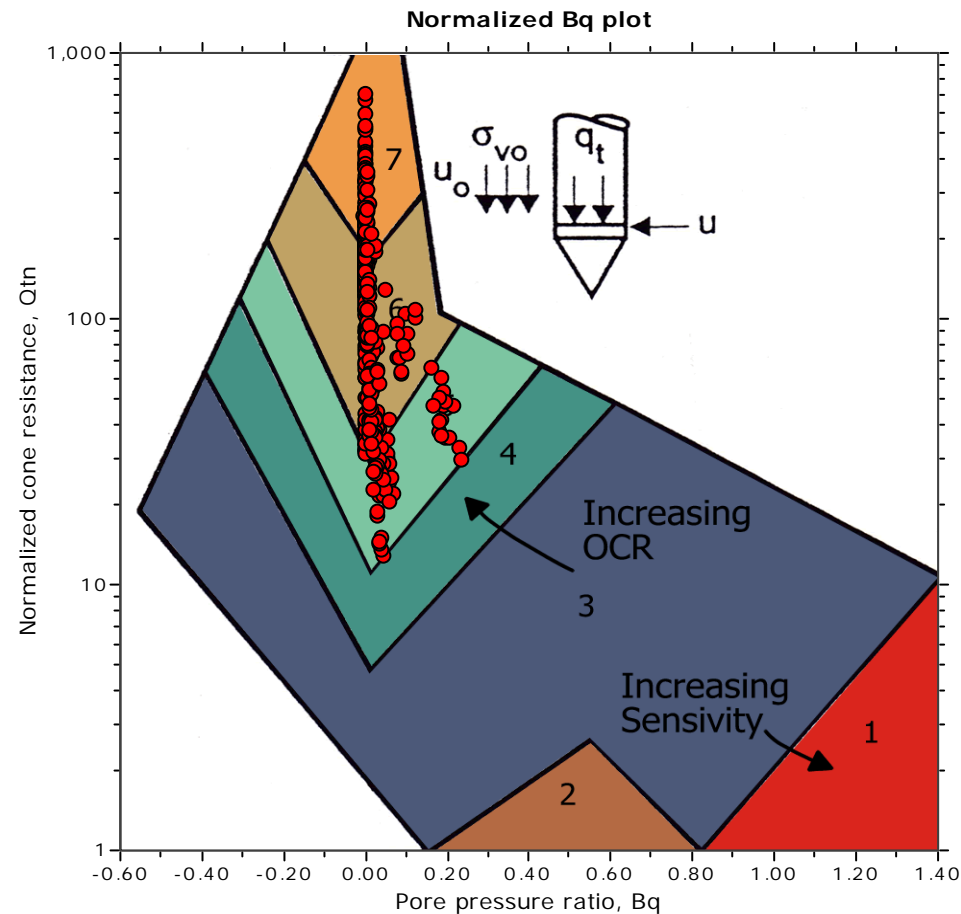
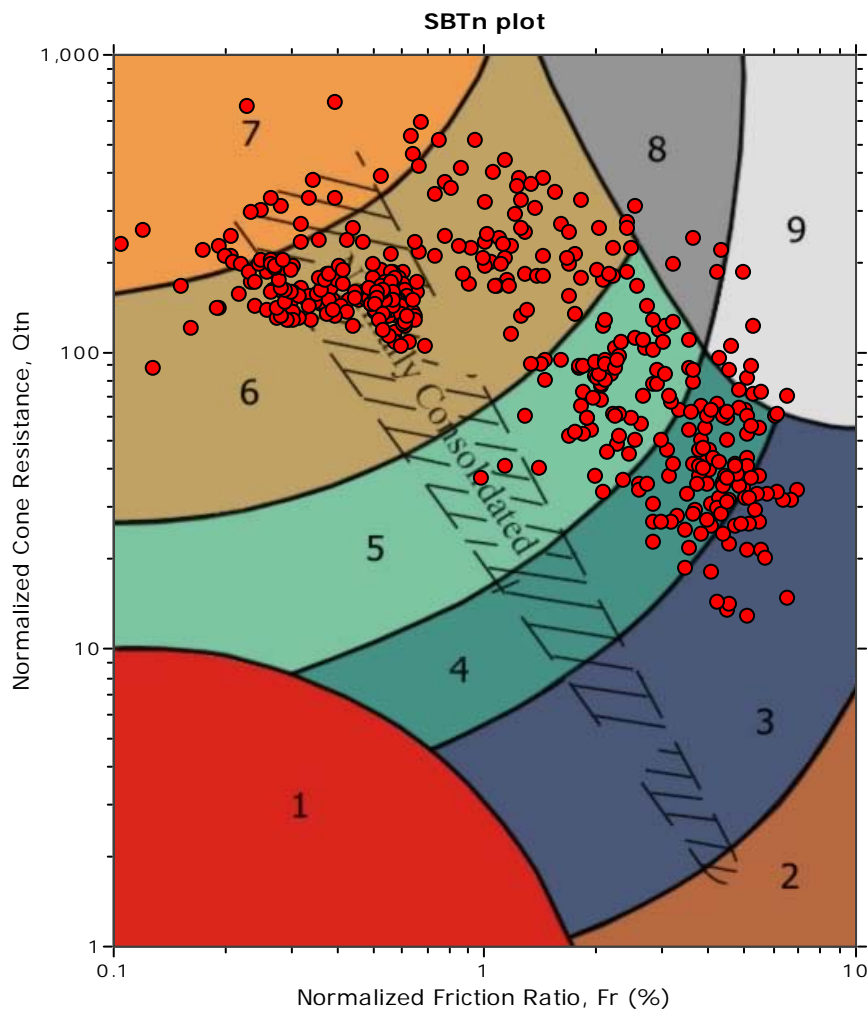


CONE PENETRATION TEST LOCATION MAP
California High Speed Train
Fresno to Bakersfield
Geotechnical Data Report - Package 1

Figure No. C8
 February 2012

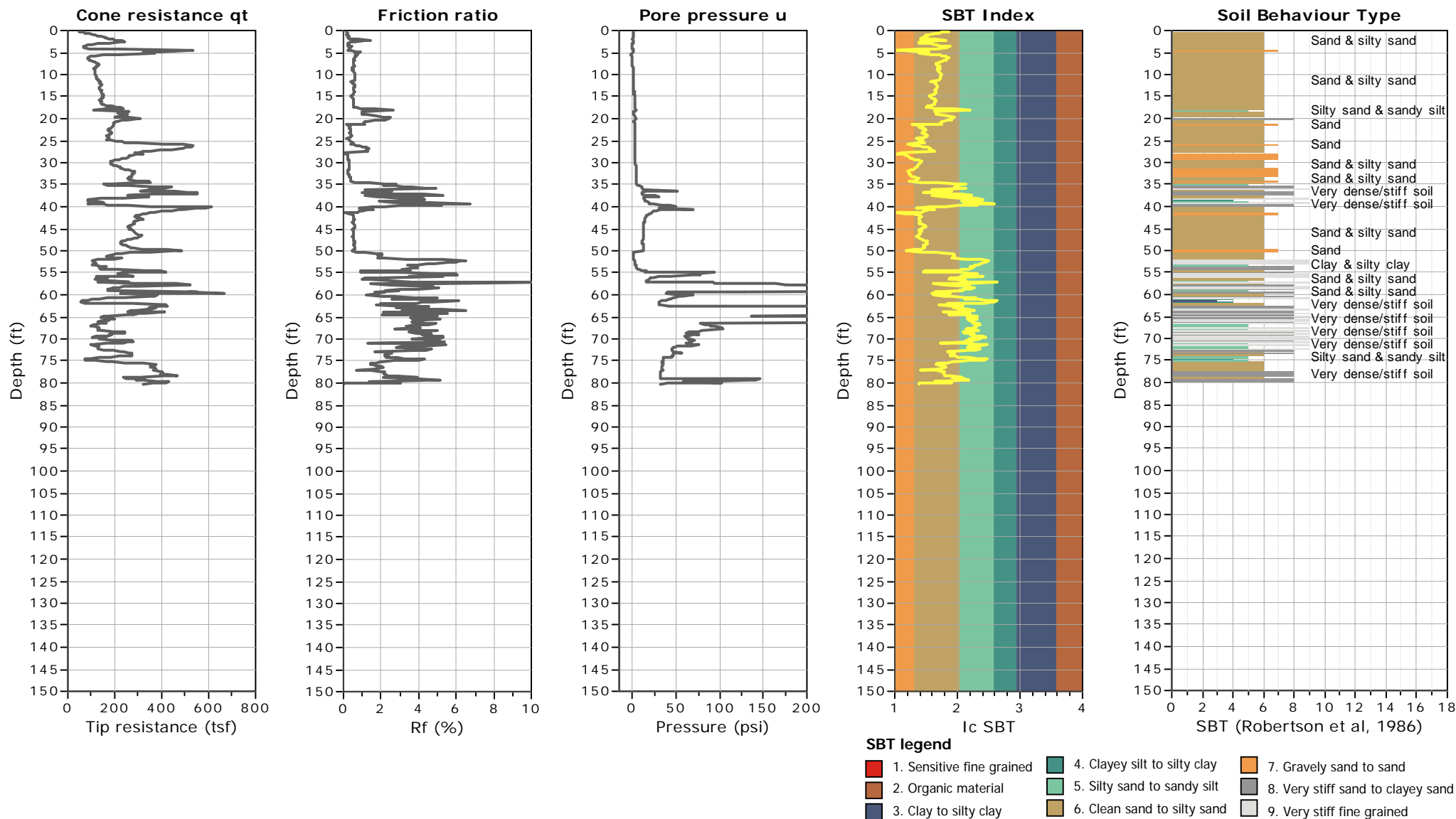


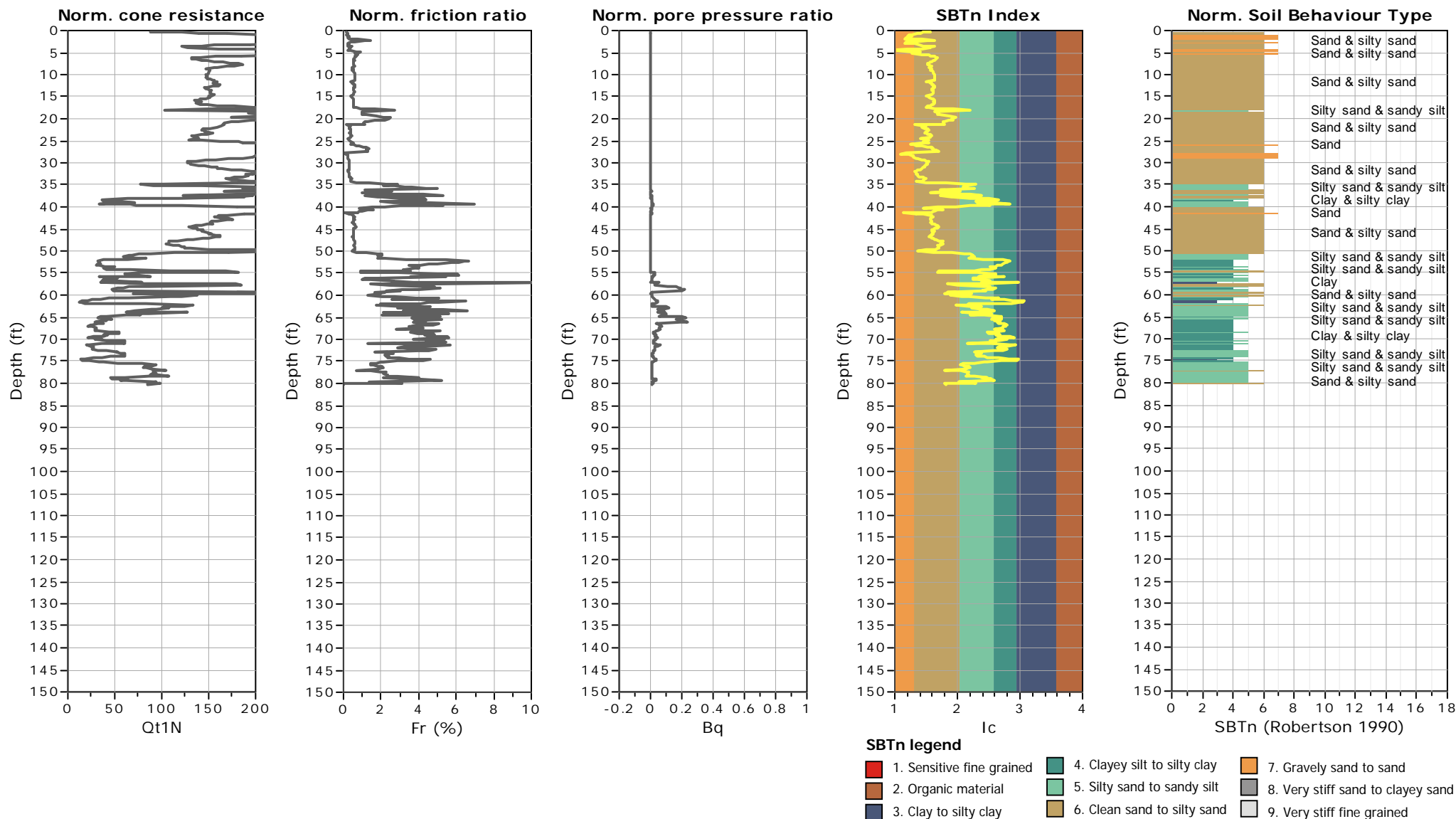
SBT - Bq plots (normalized)



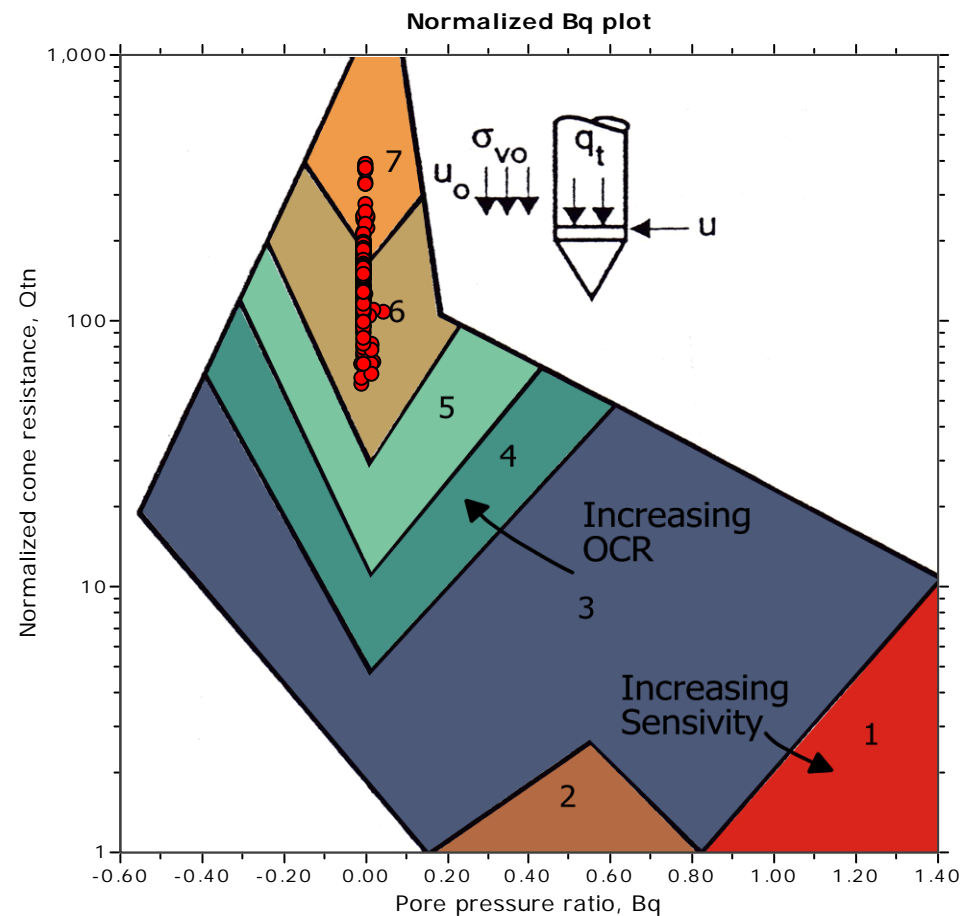
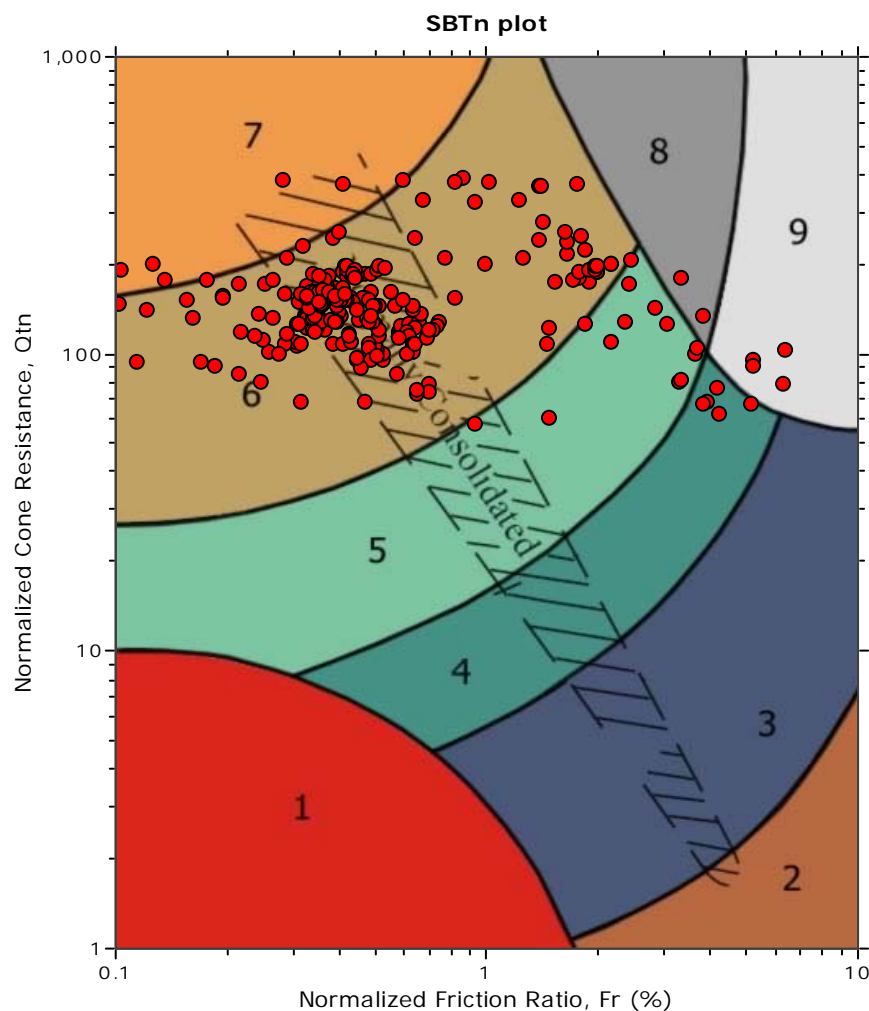
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



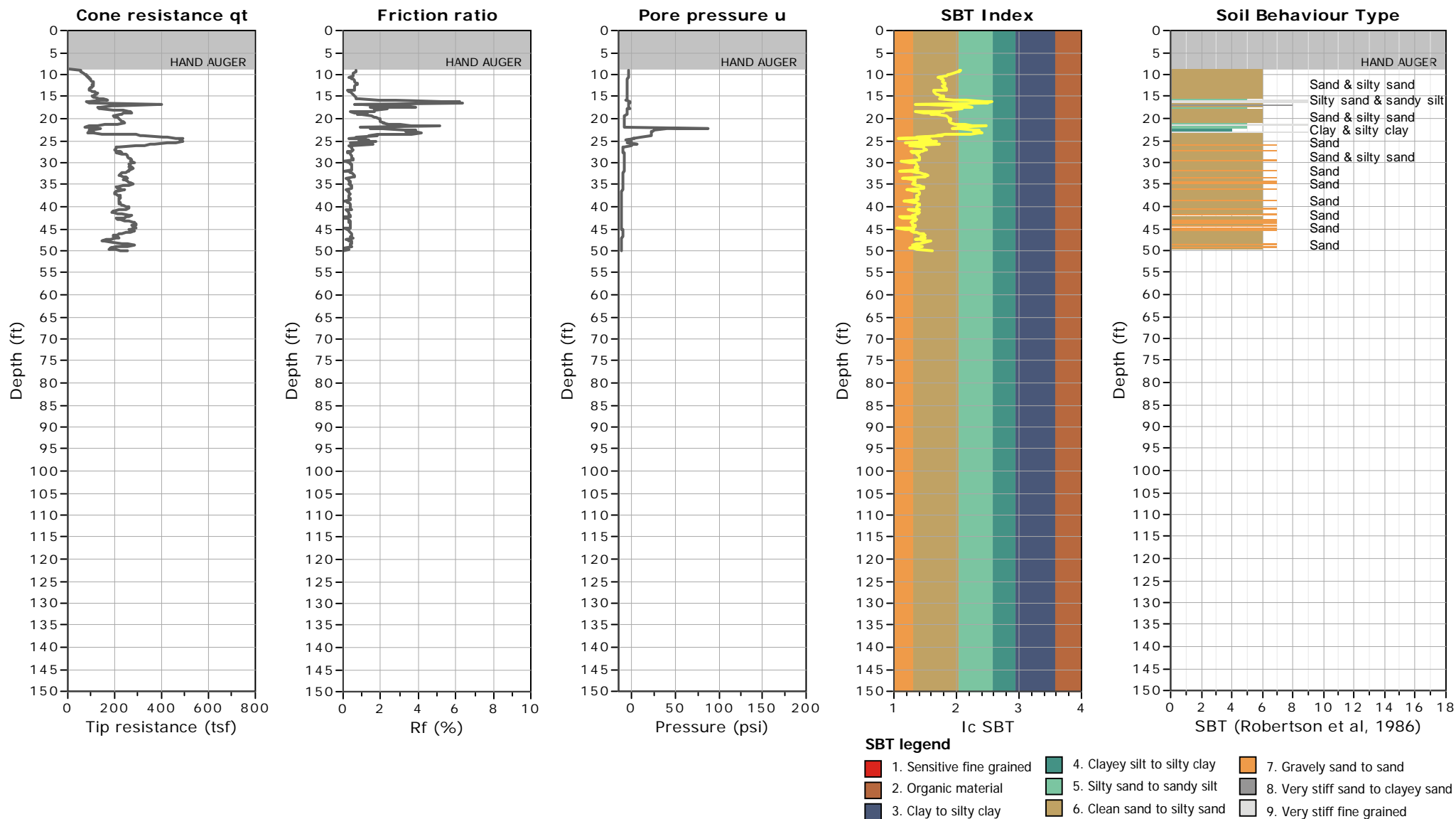


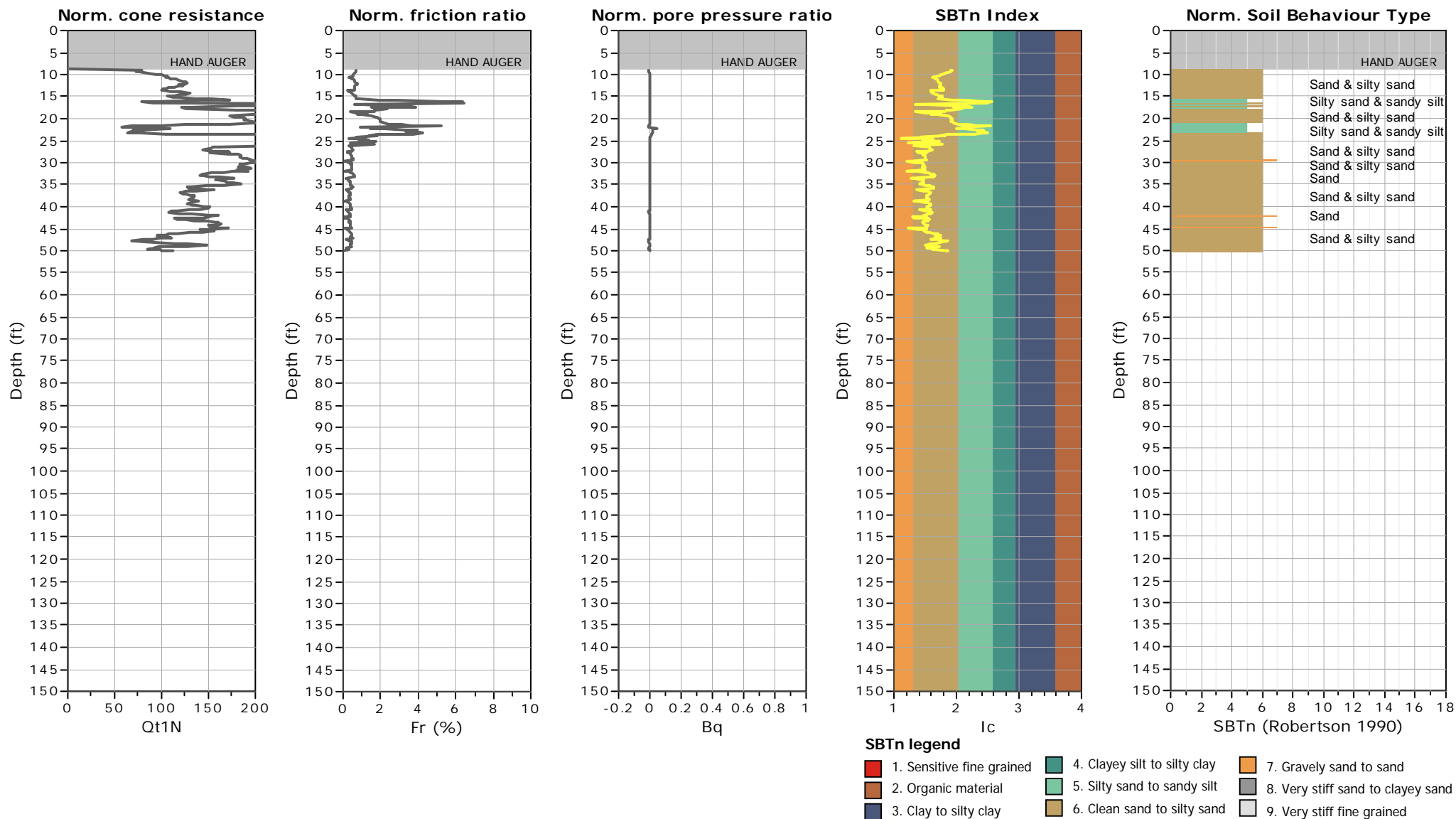
SBT - Bq plots (normalized)



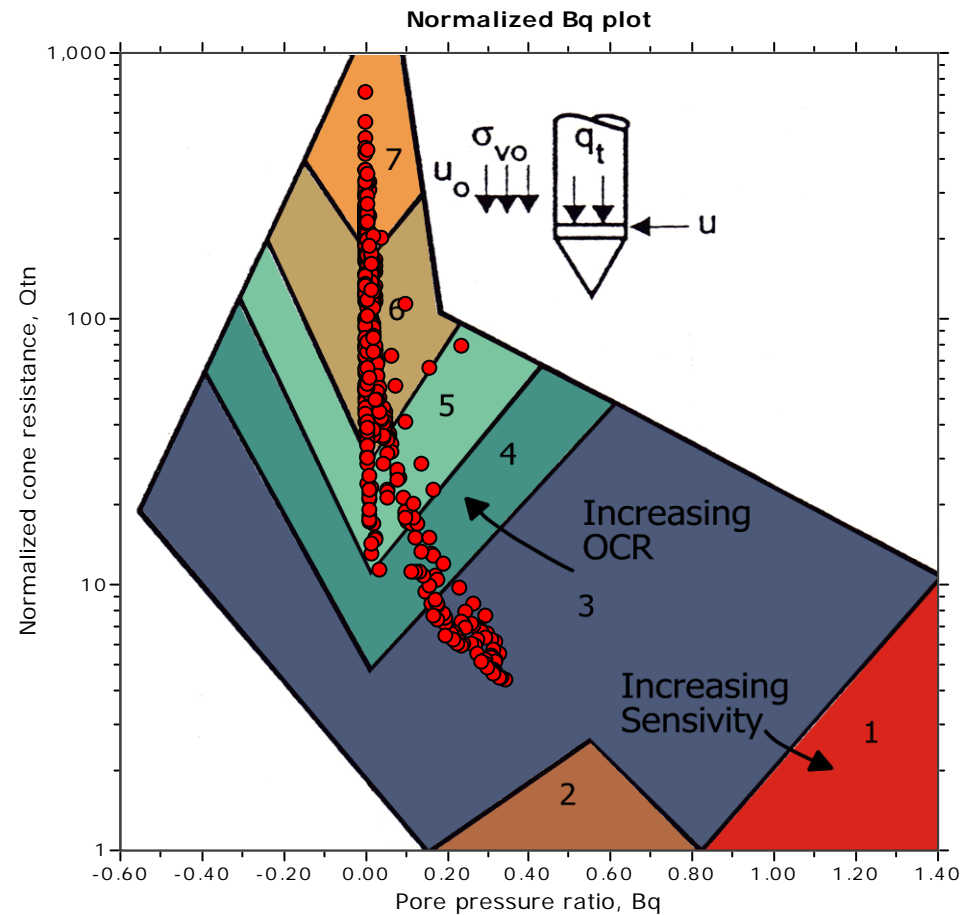
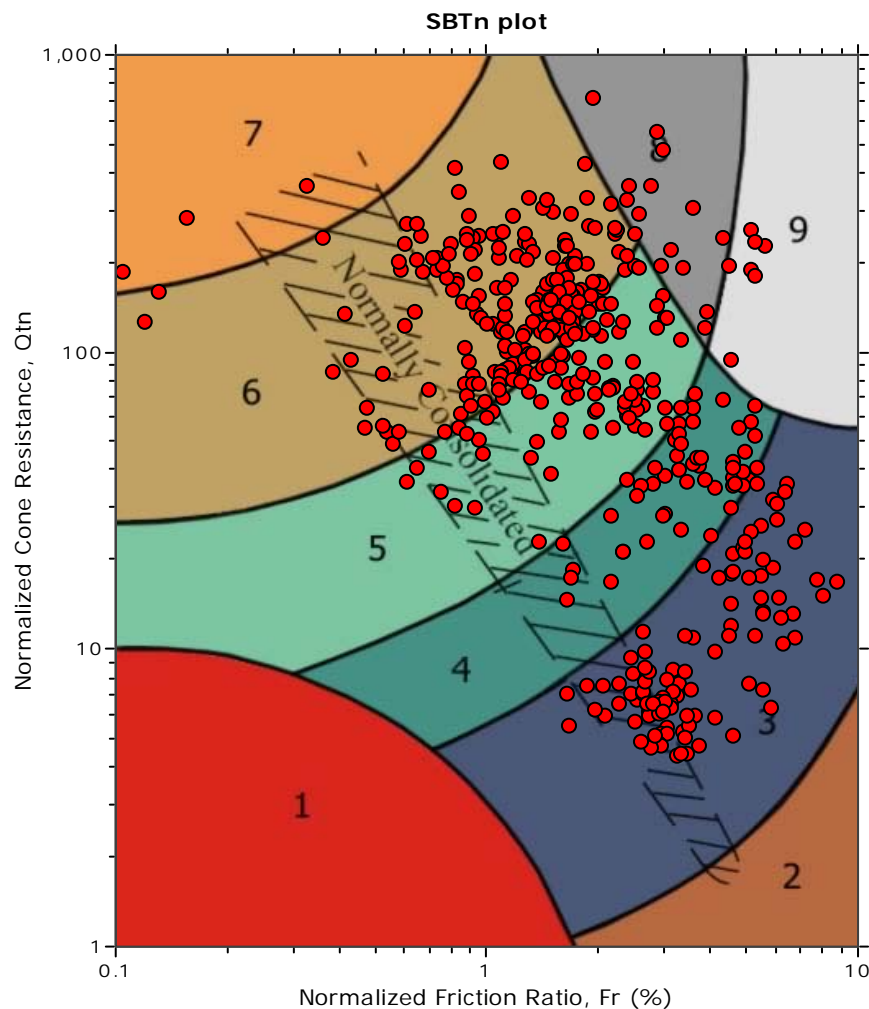
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



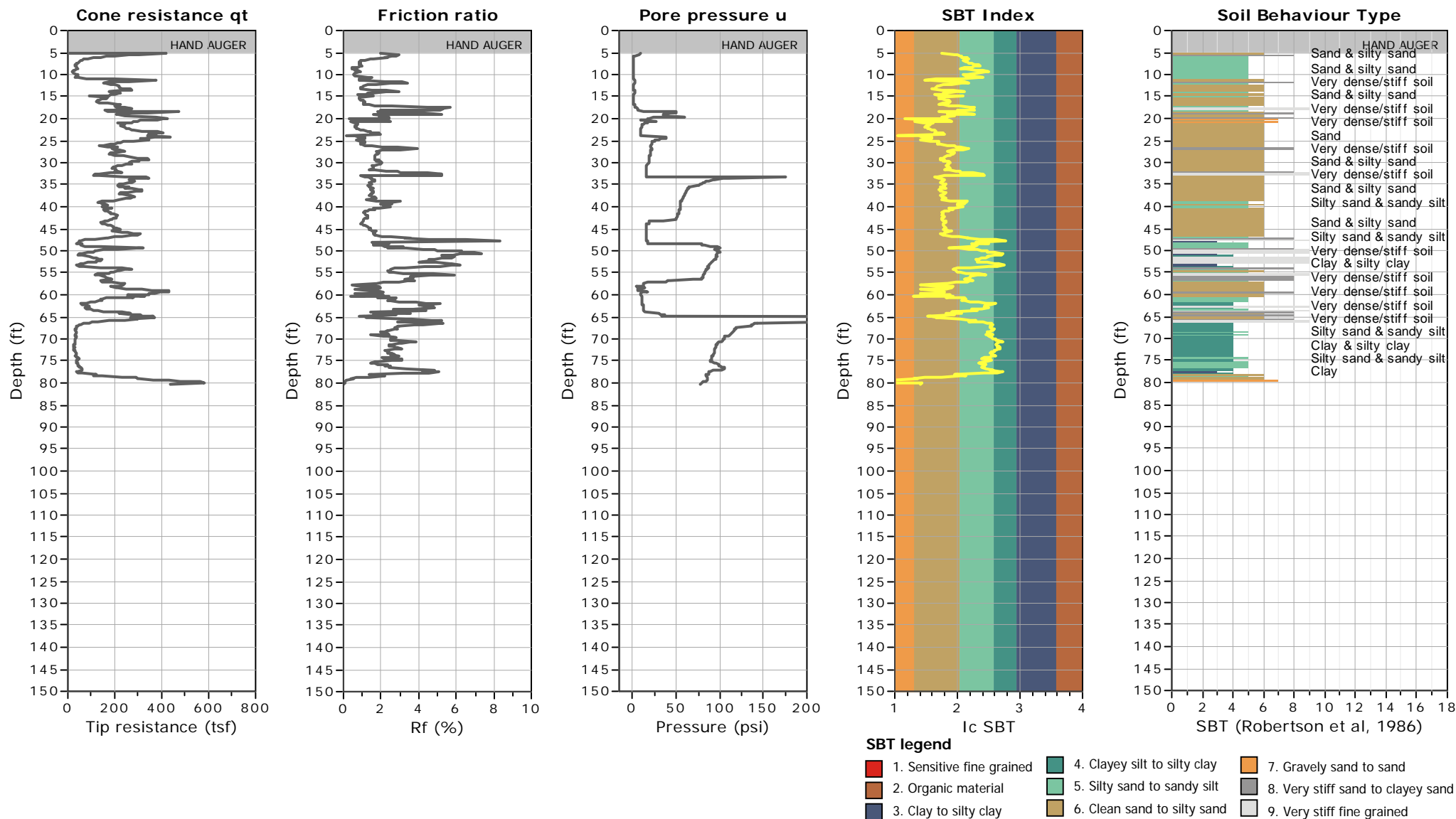


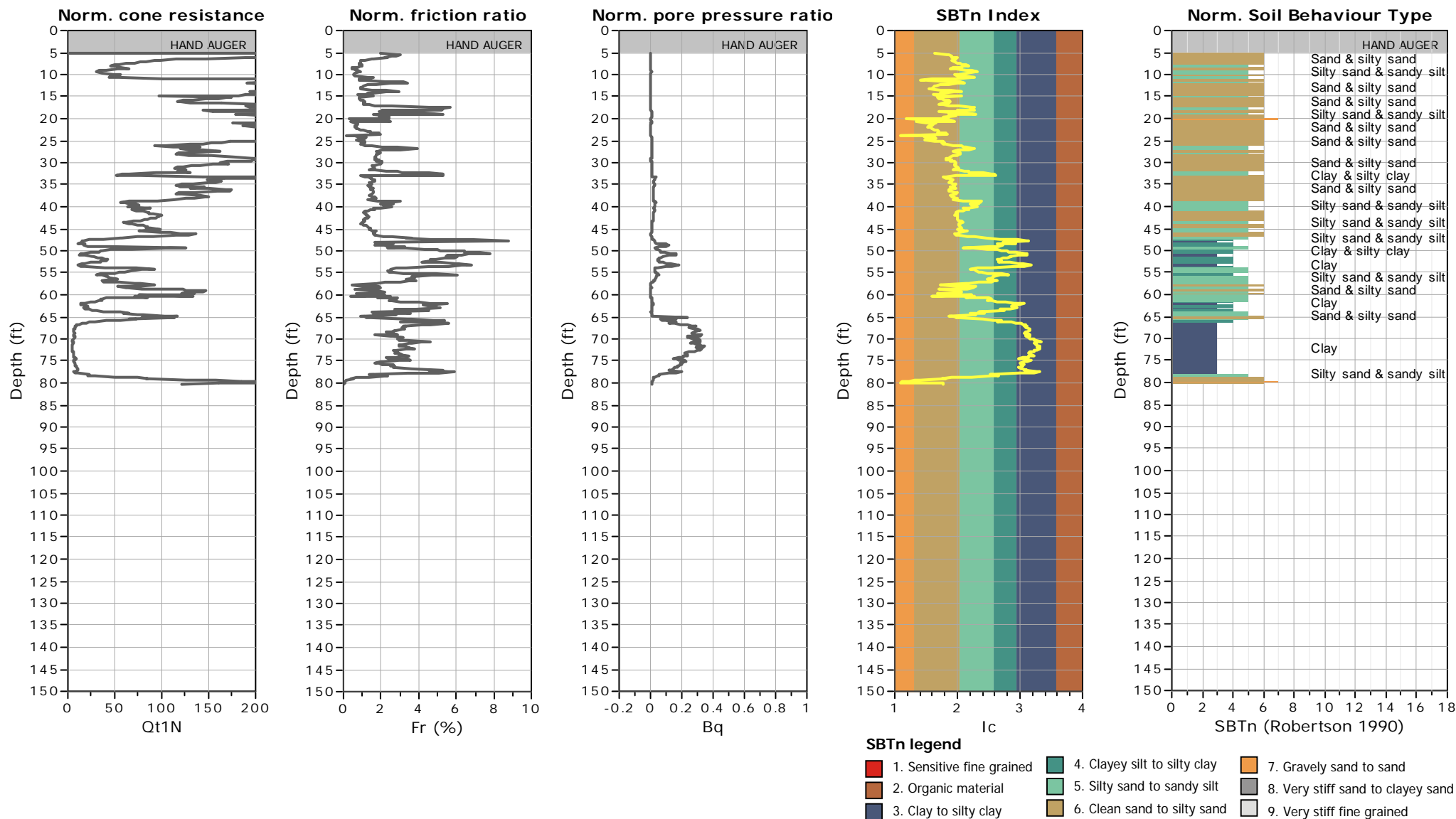
SBT - Bq plots (normalized)



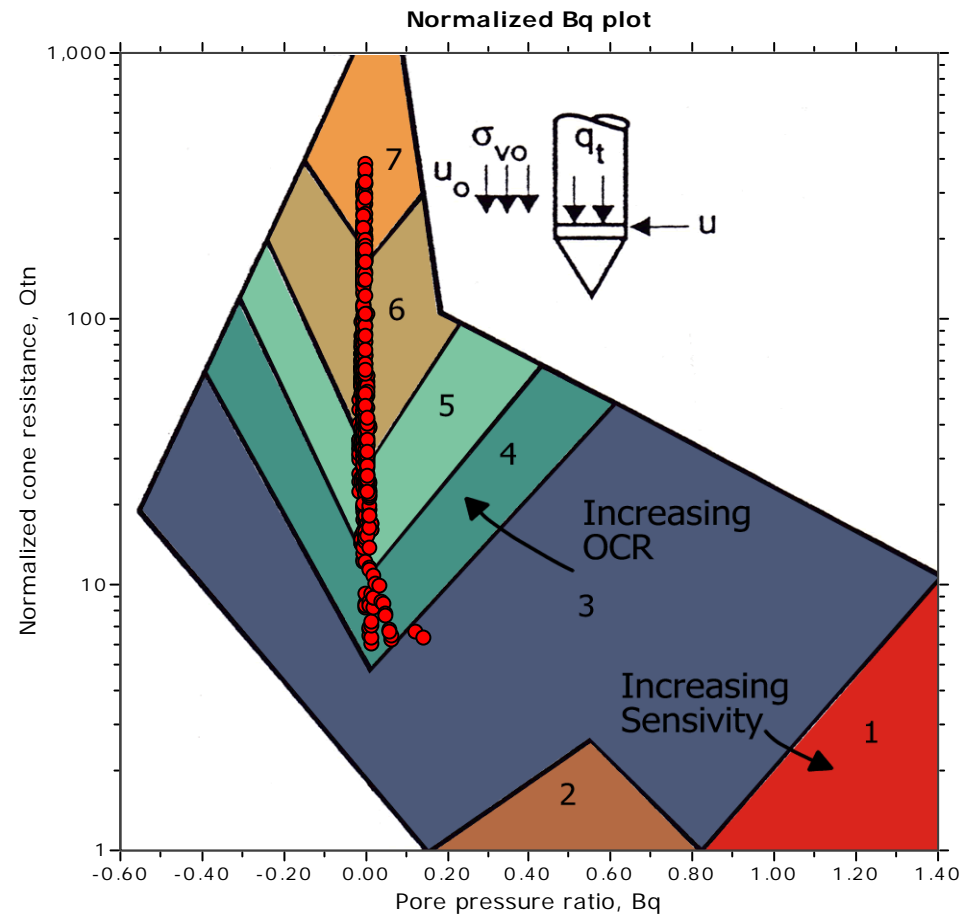
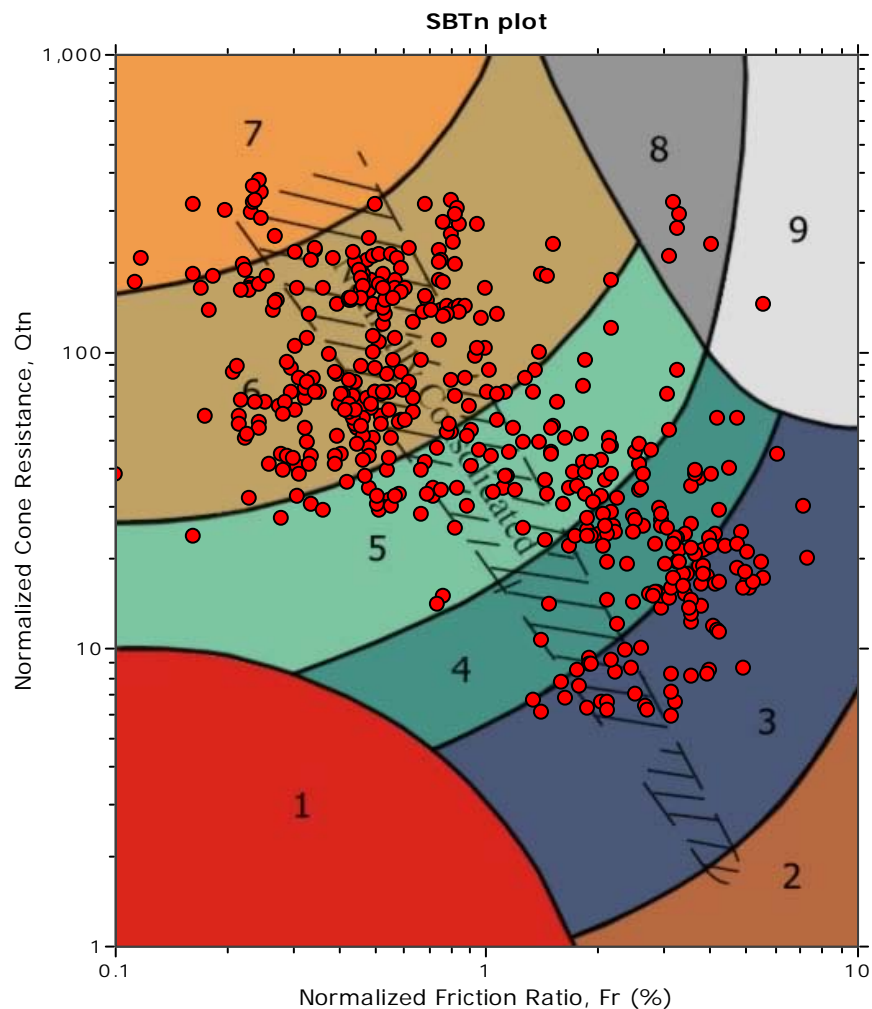
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



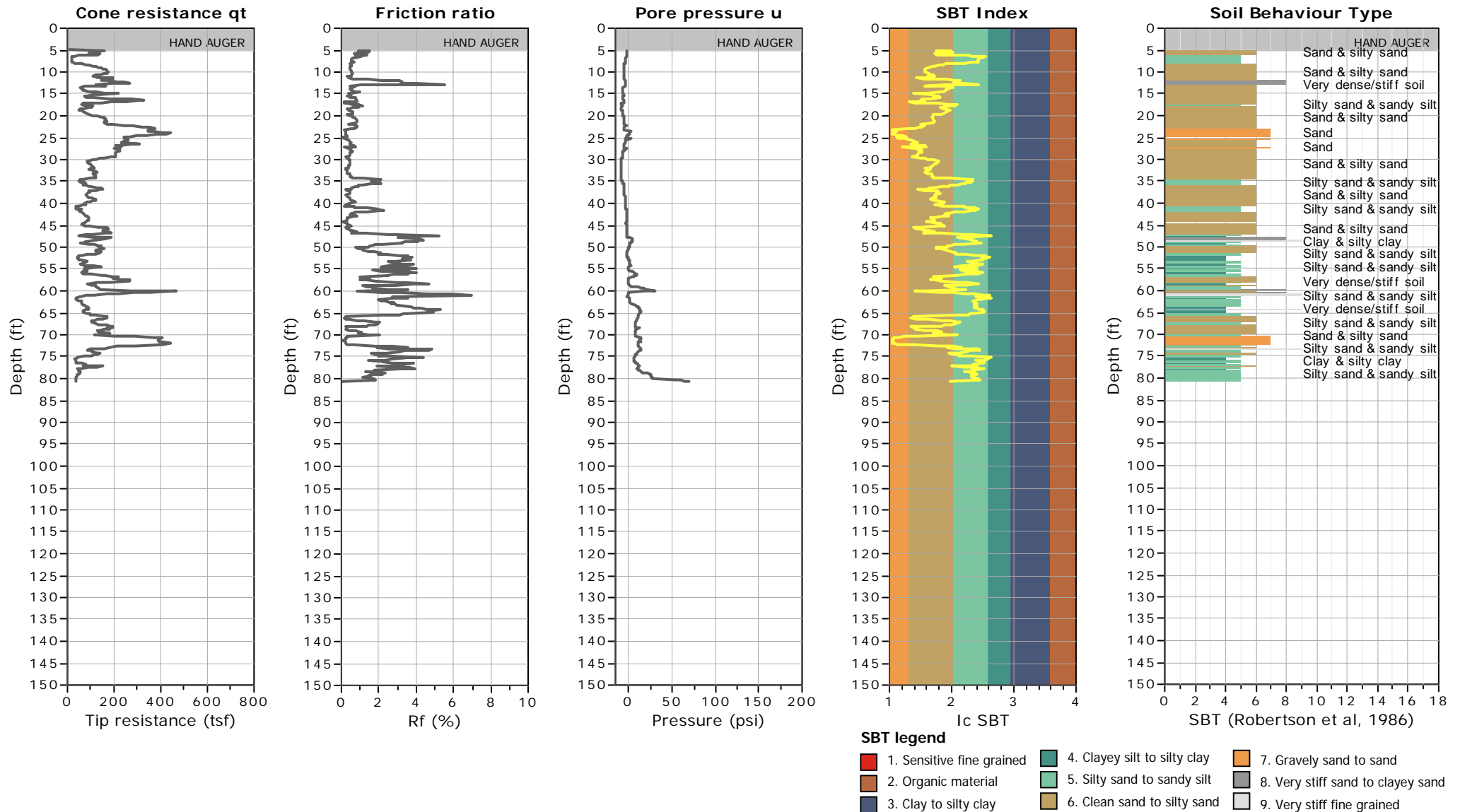


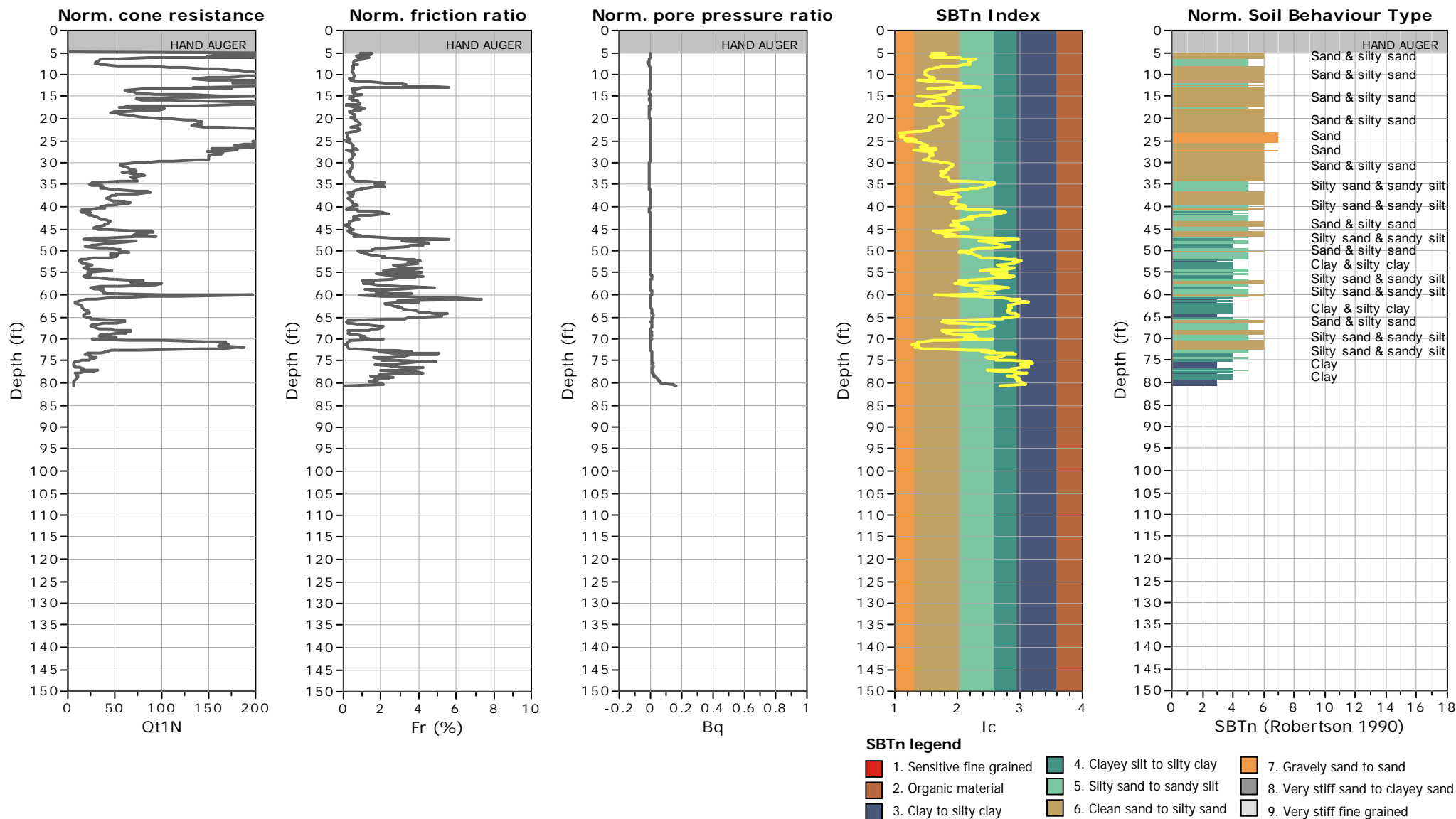
SBT - Bq plots (normalized)



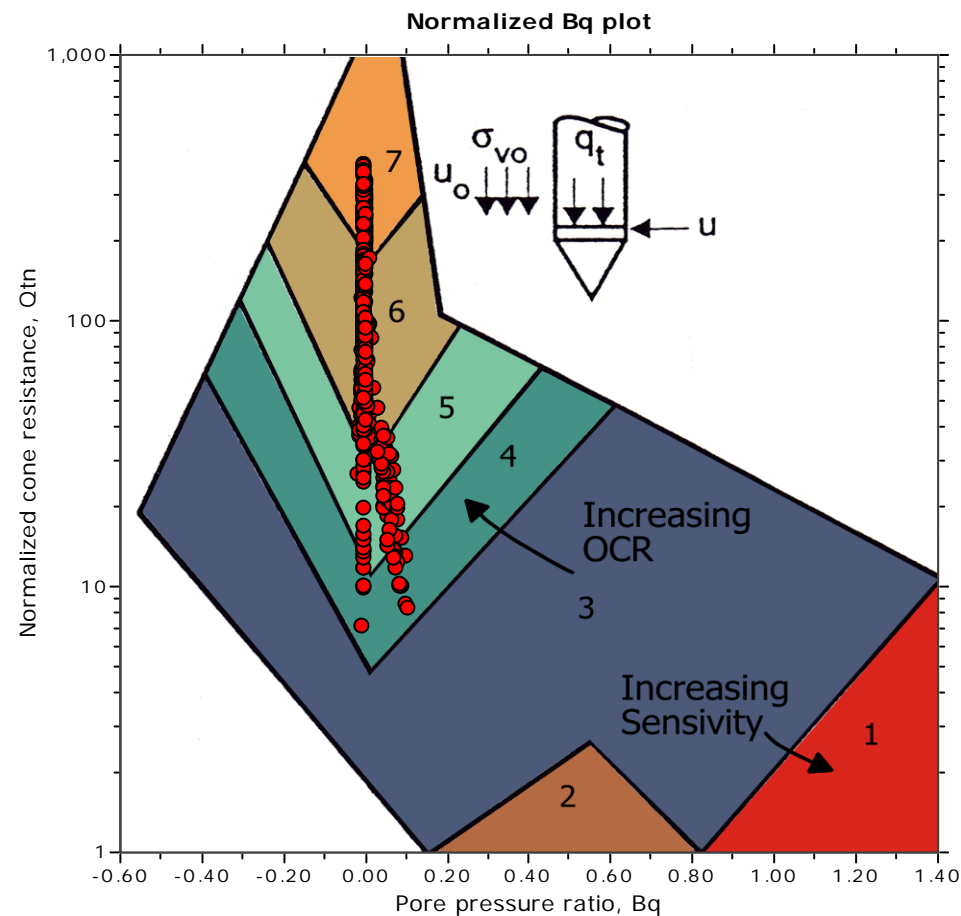
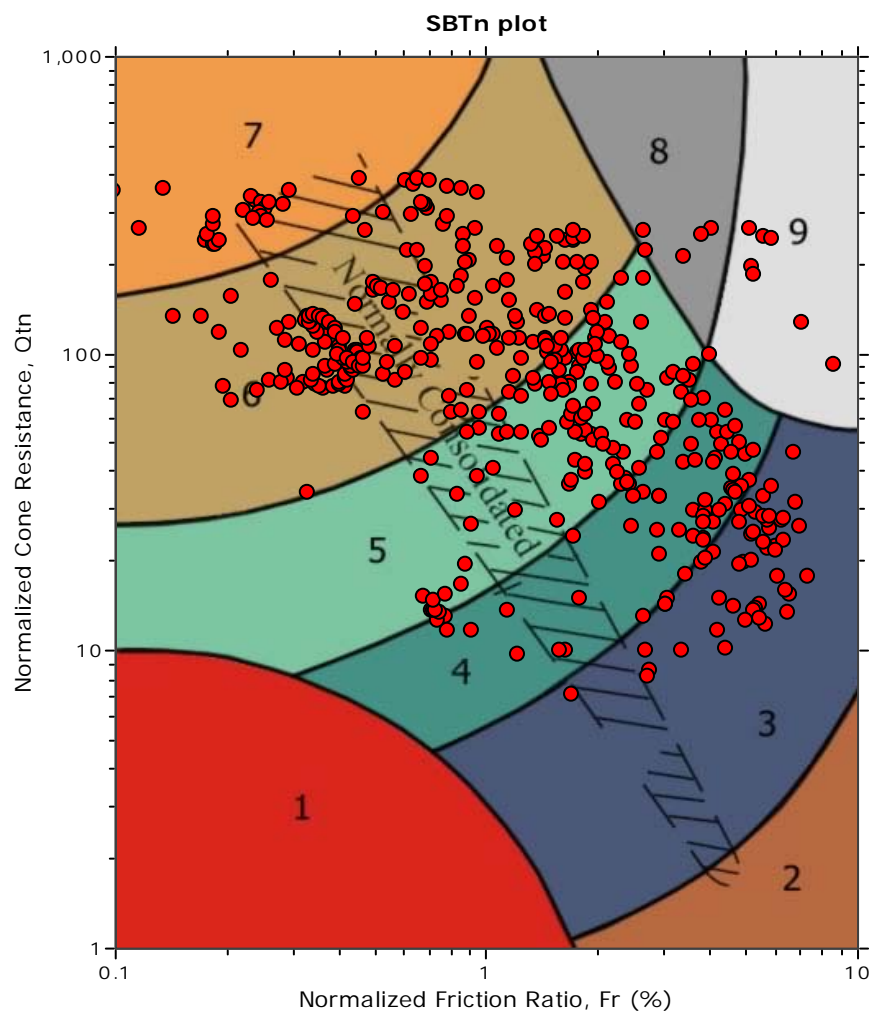
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



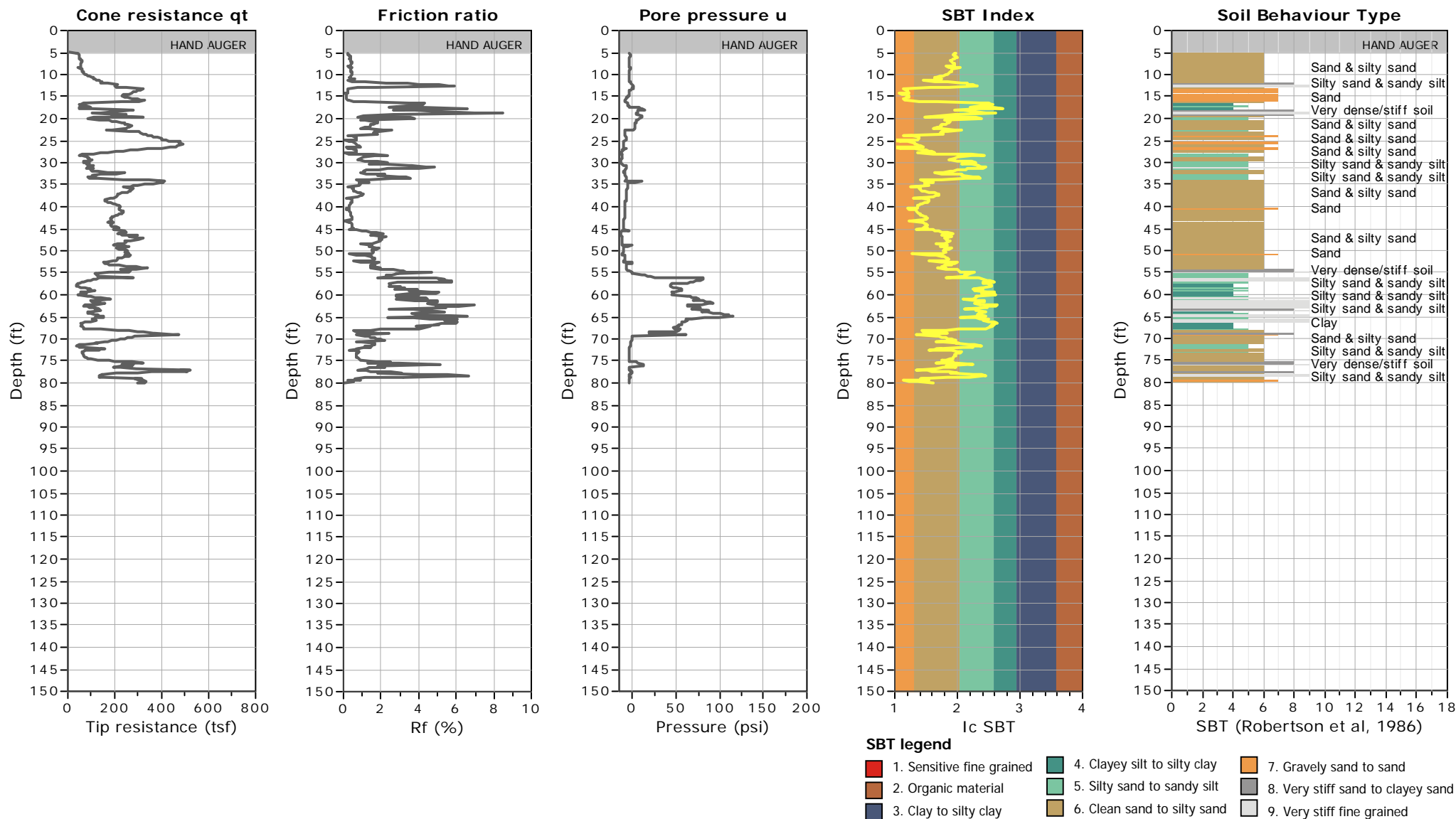


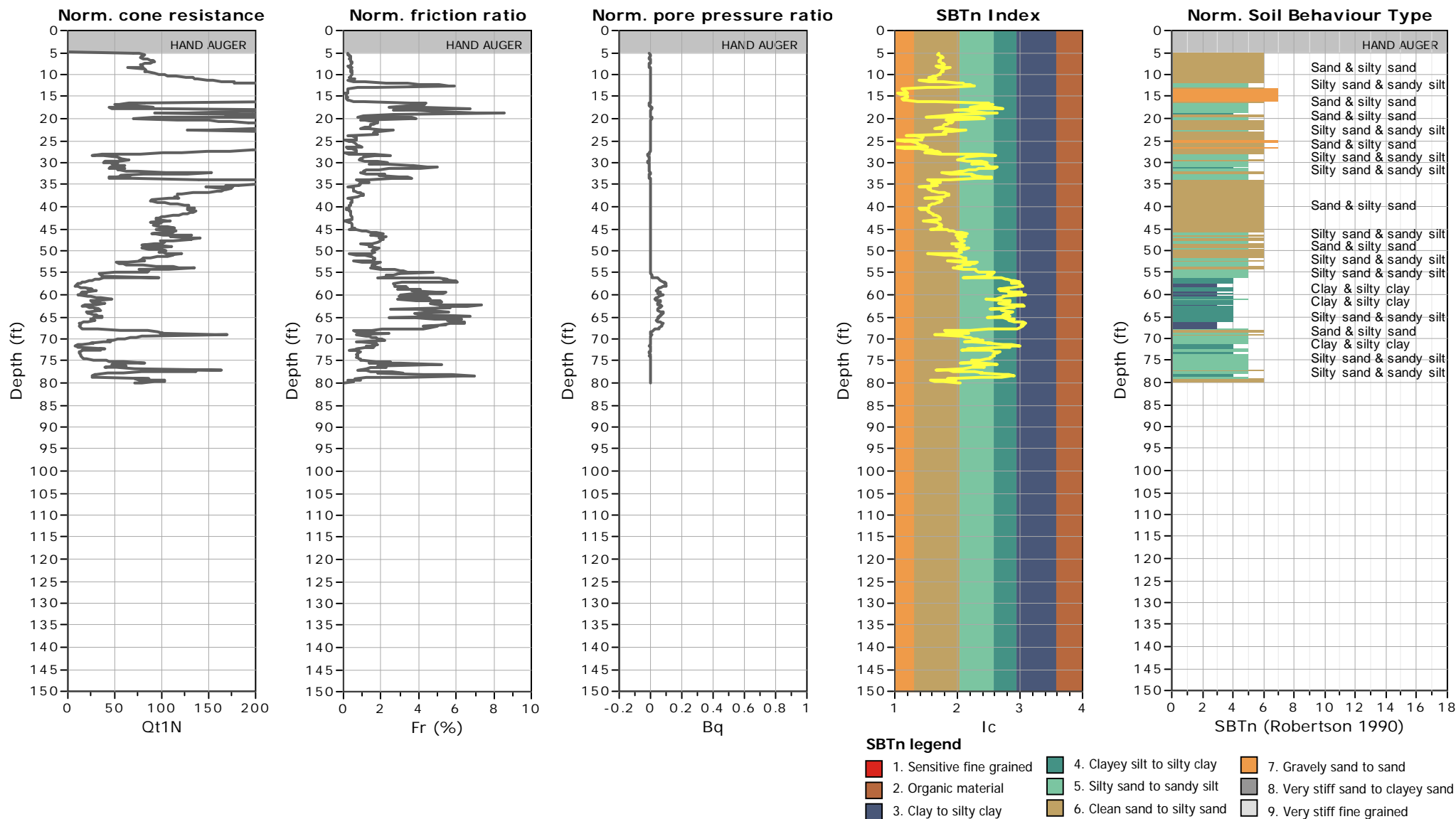
SBT - Bq plots (normalized)



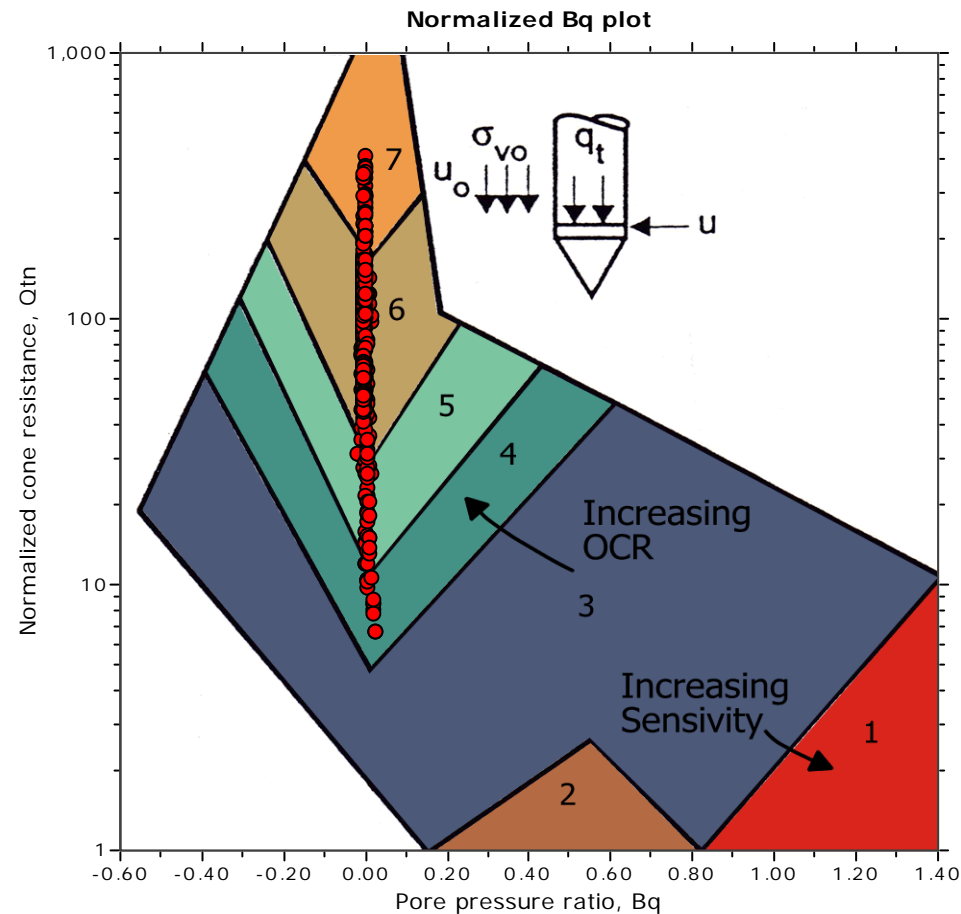
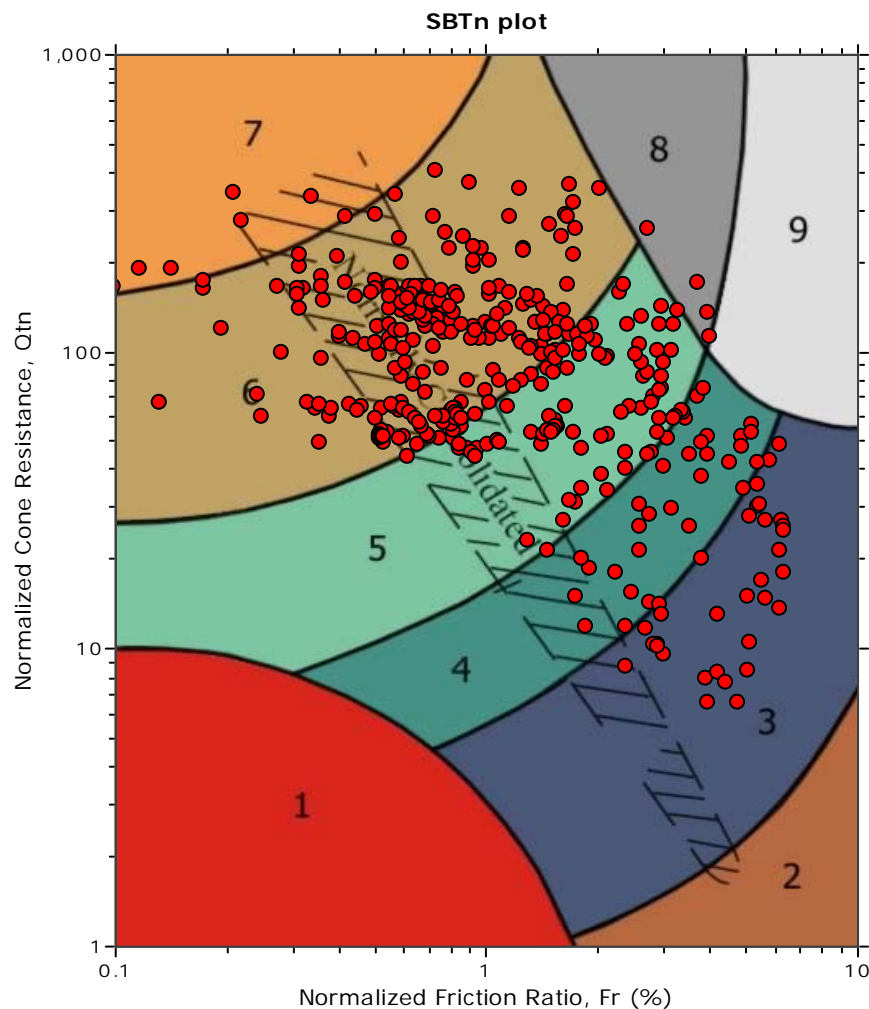
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



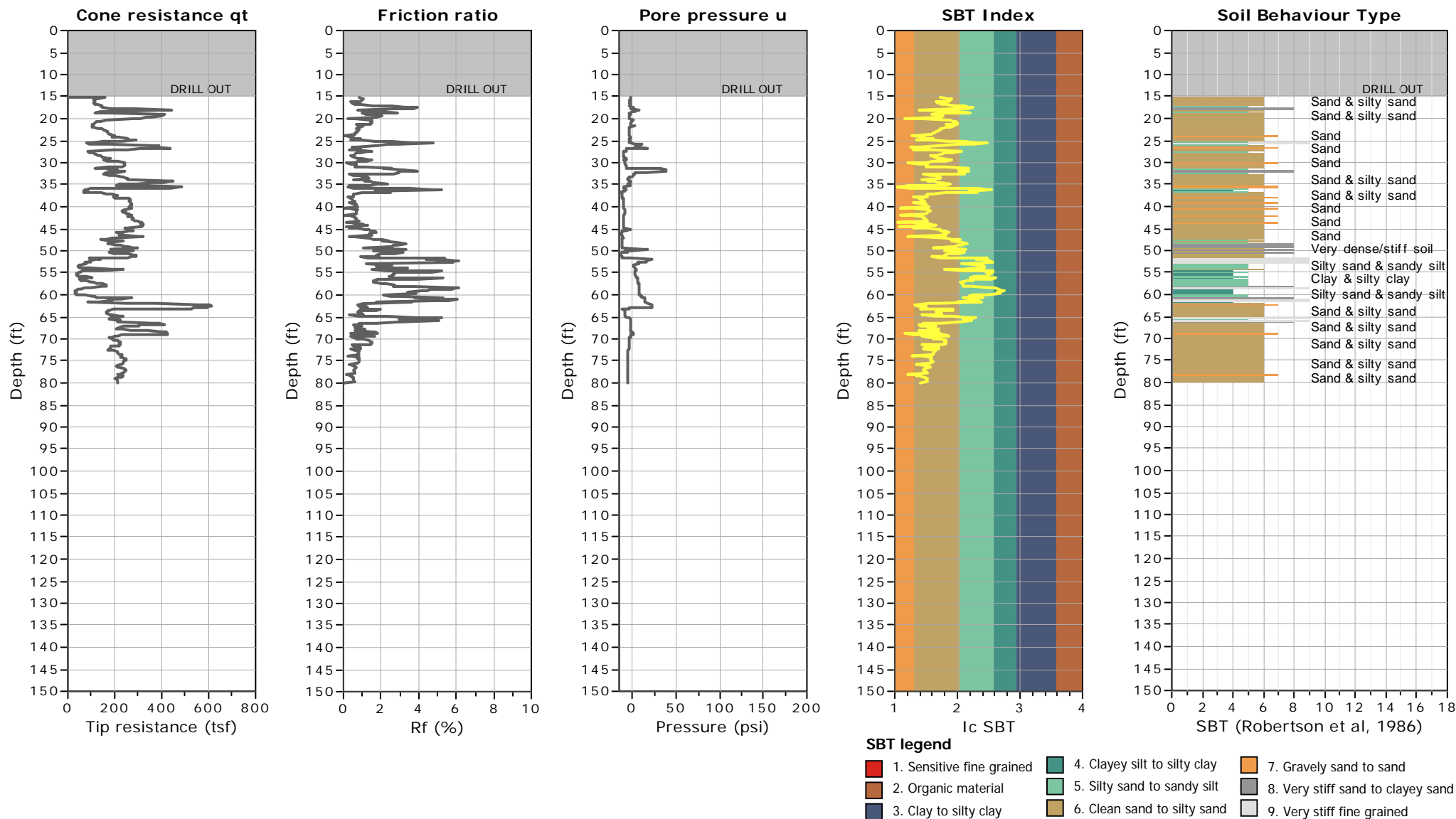


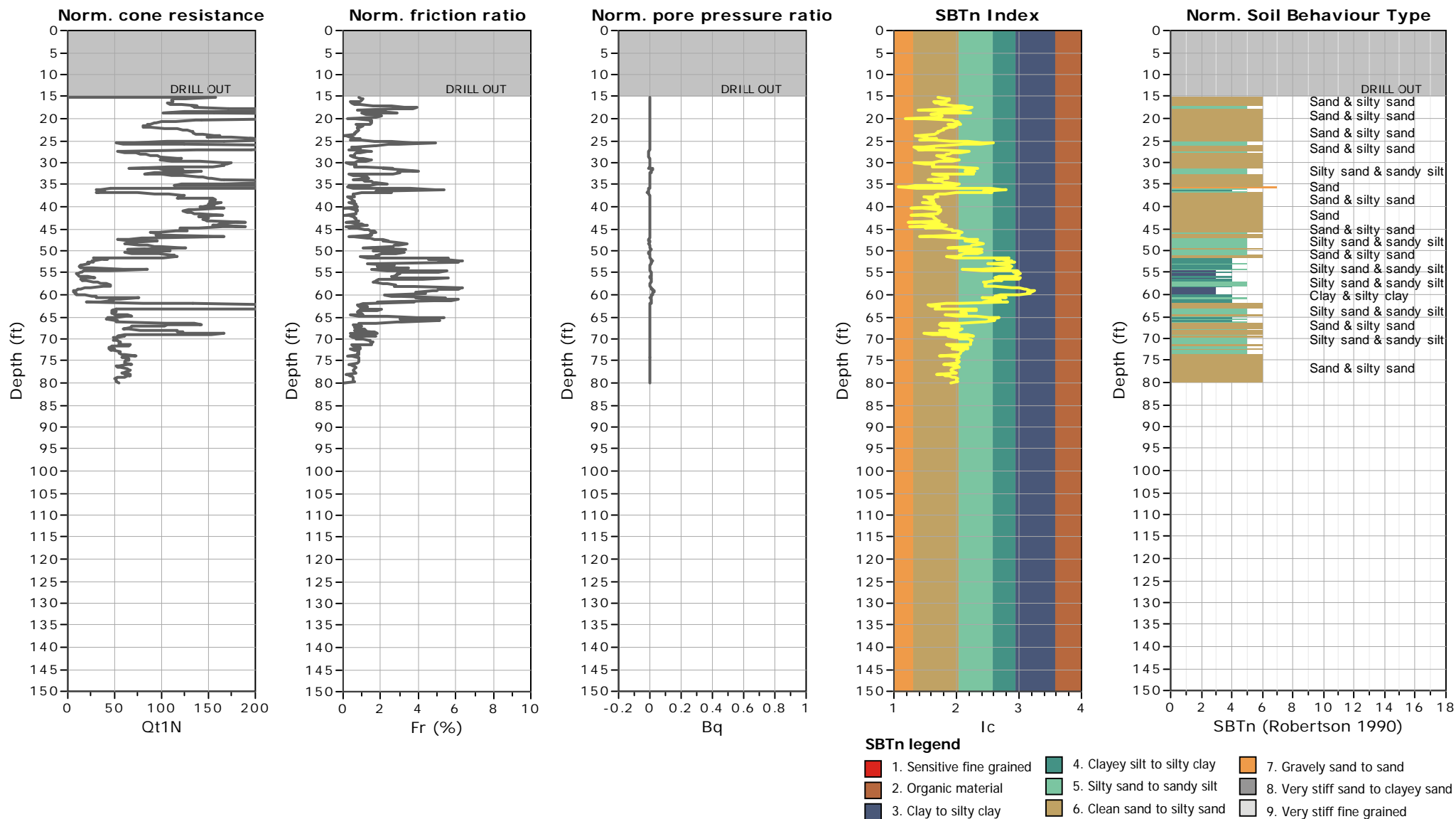
SBT - Bq plots (normalized)



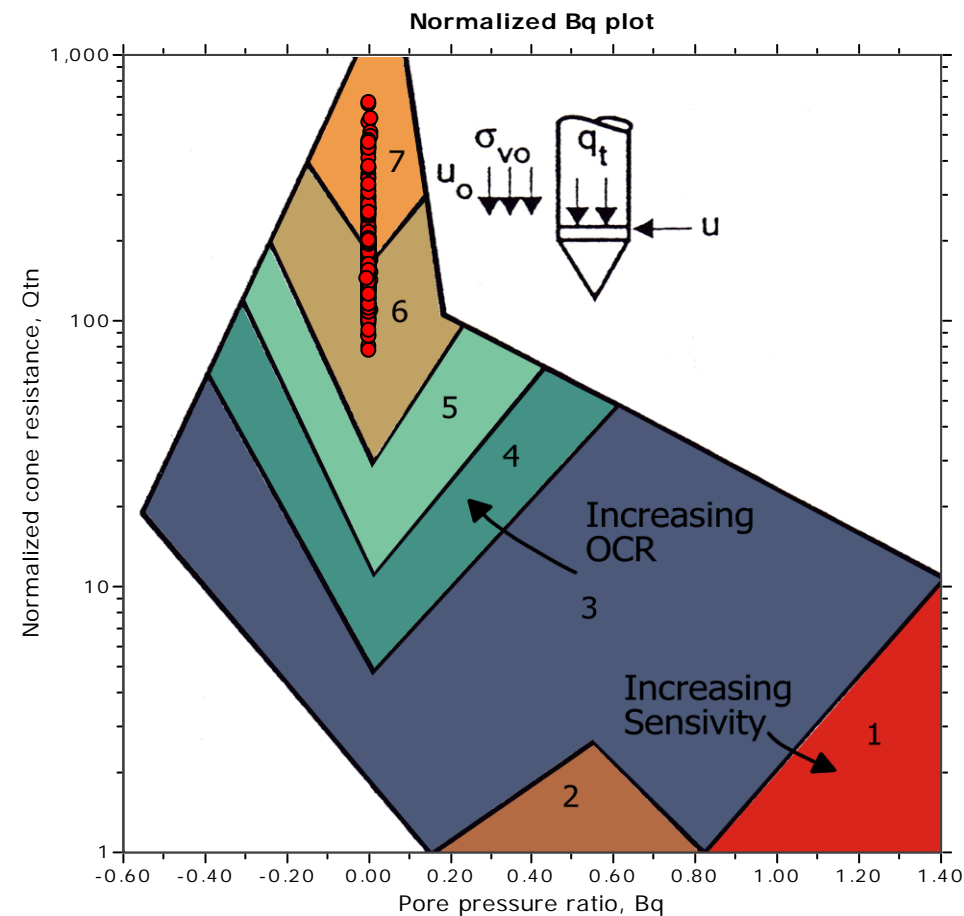
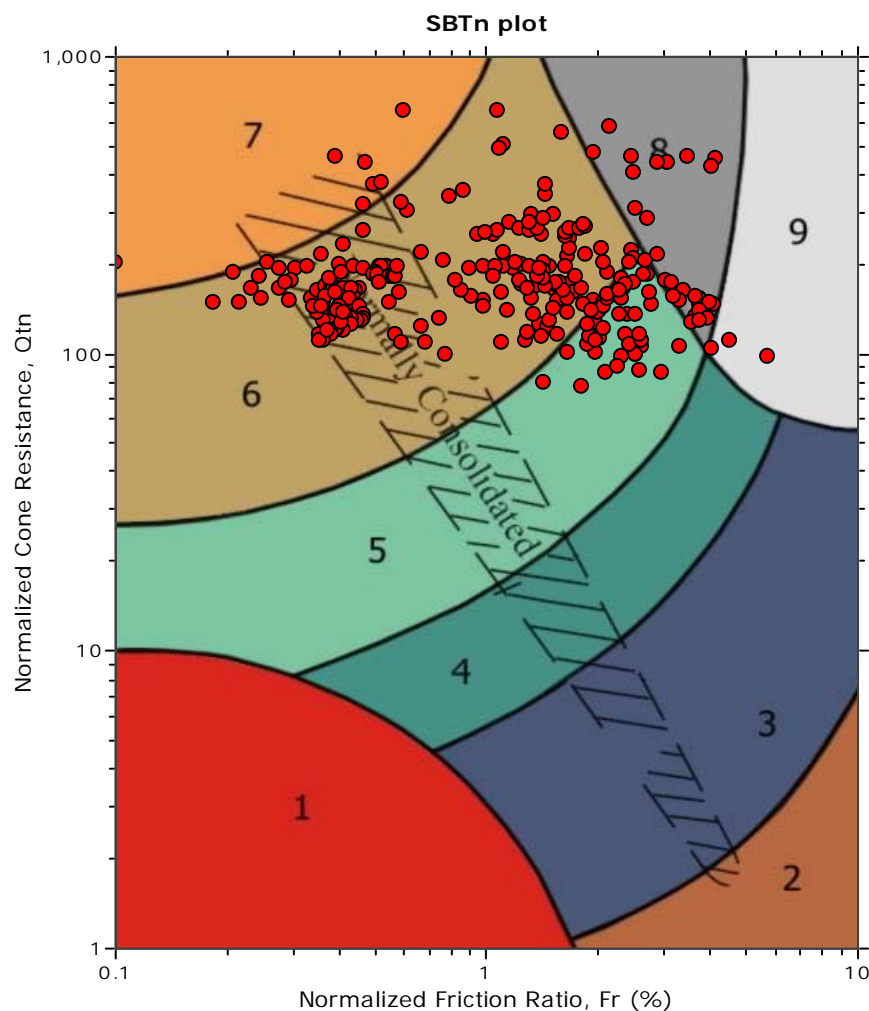
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



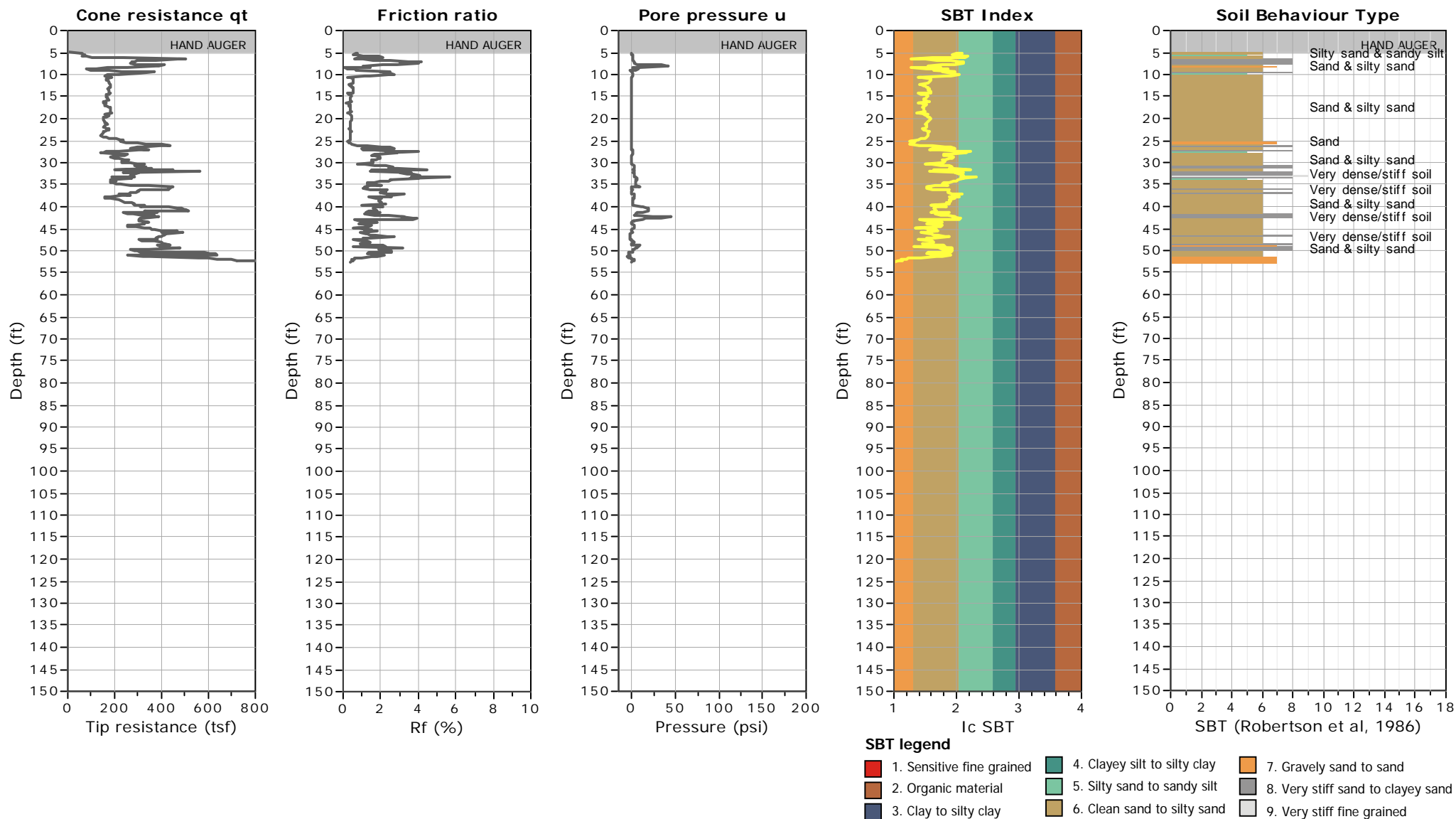


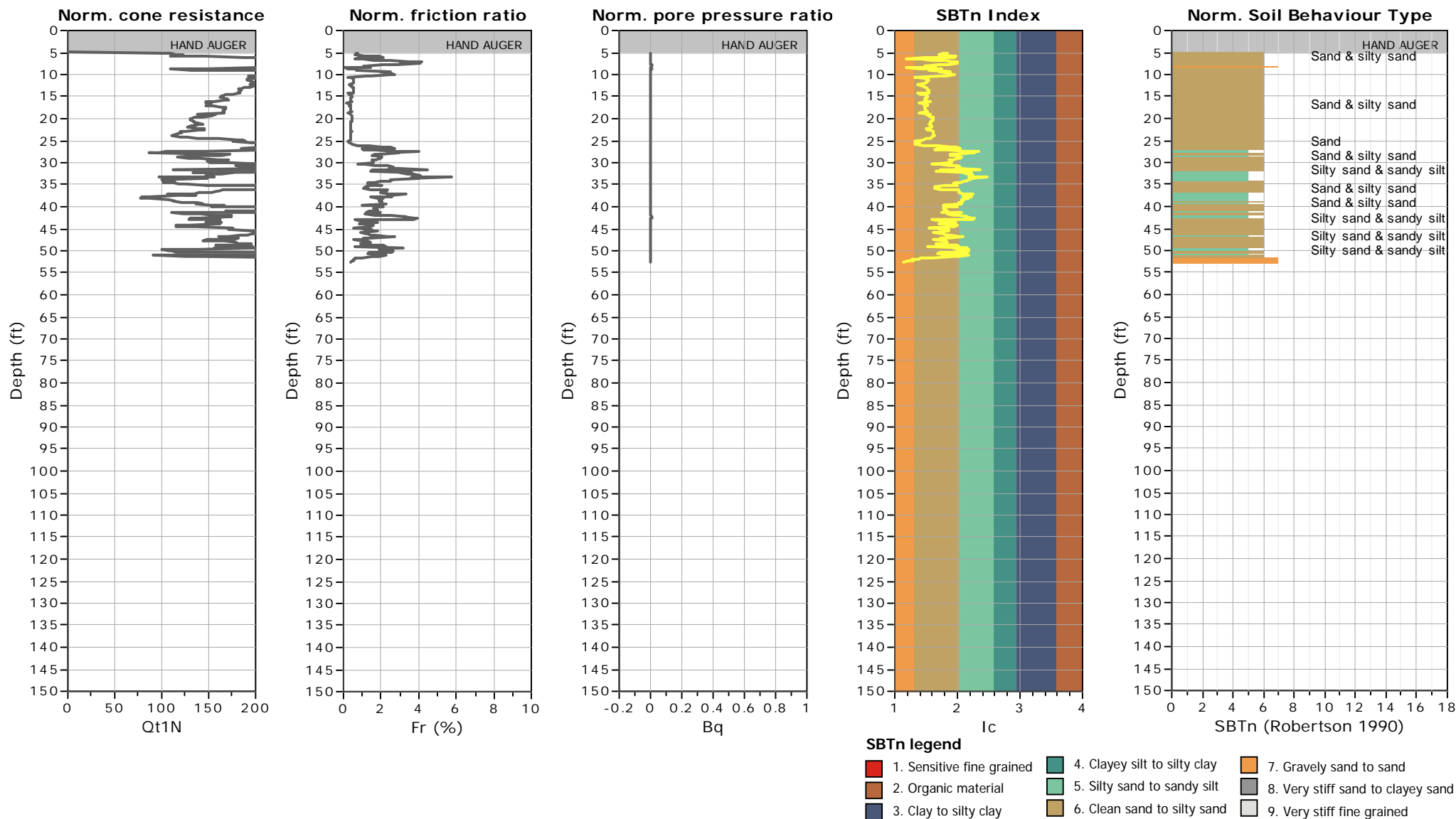
SBT - Bq plots (normalized)



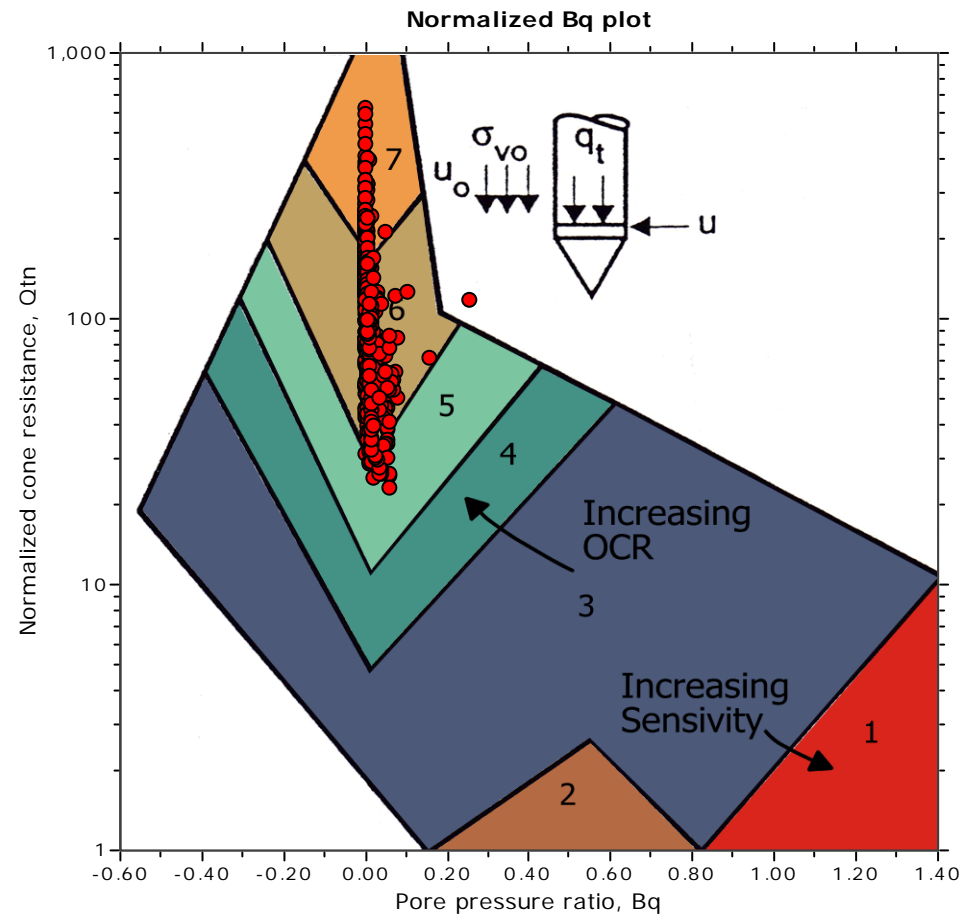
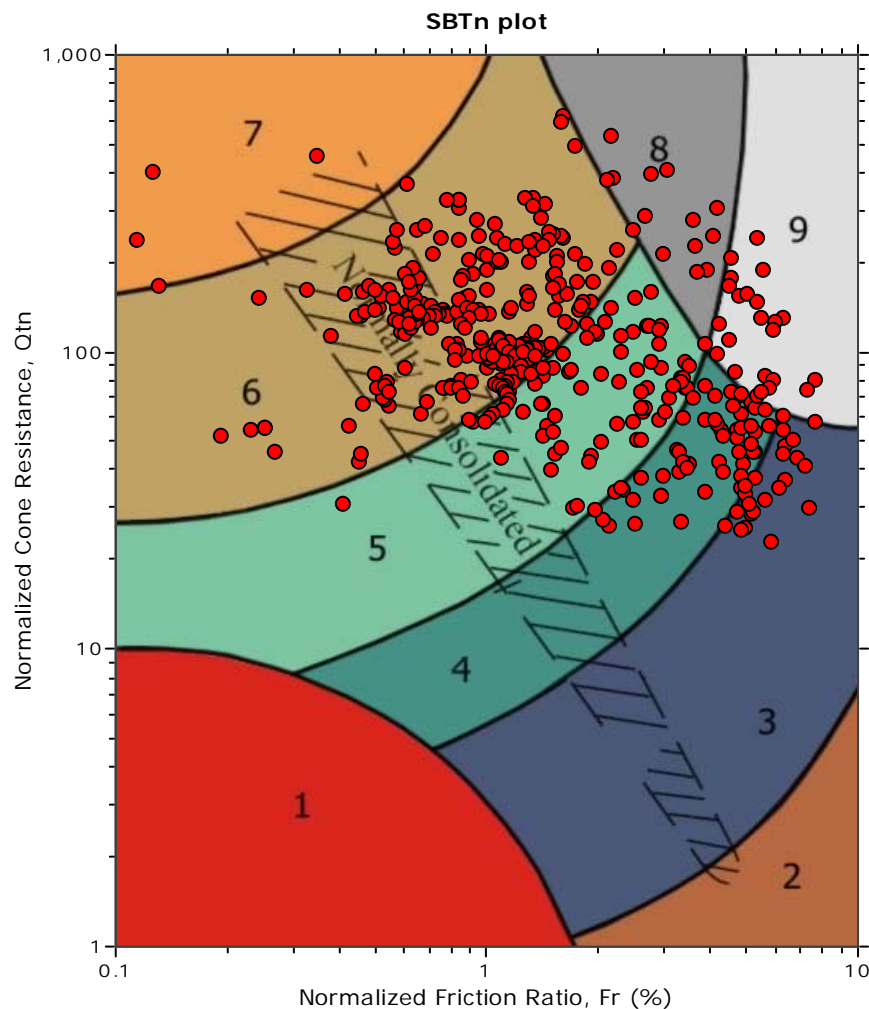
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



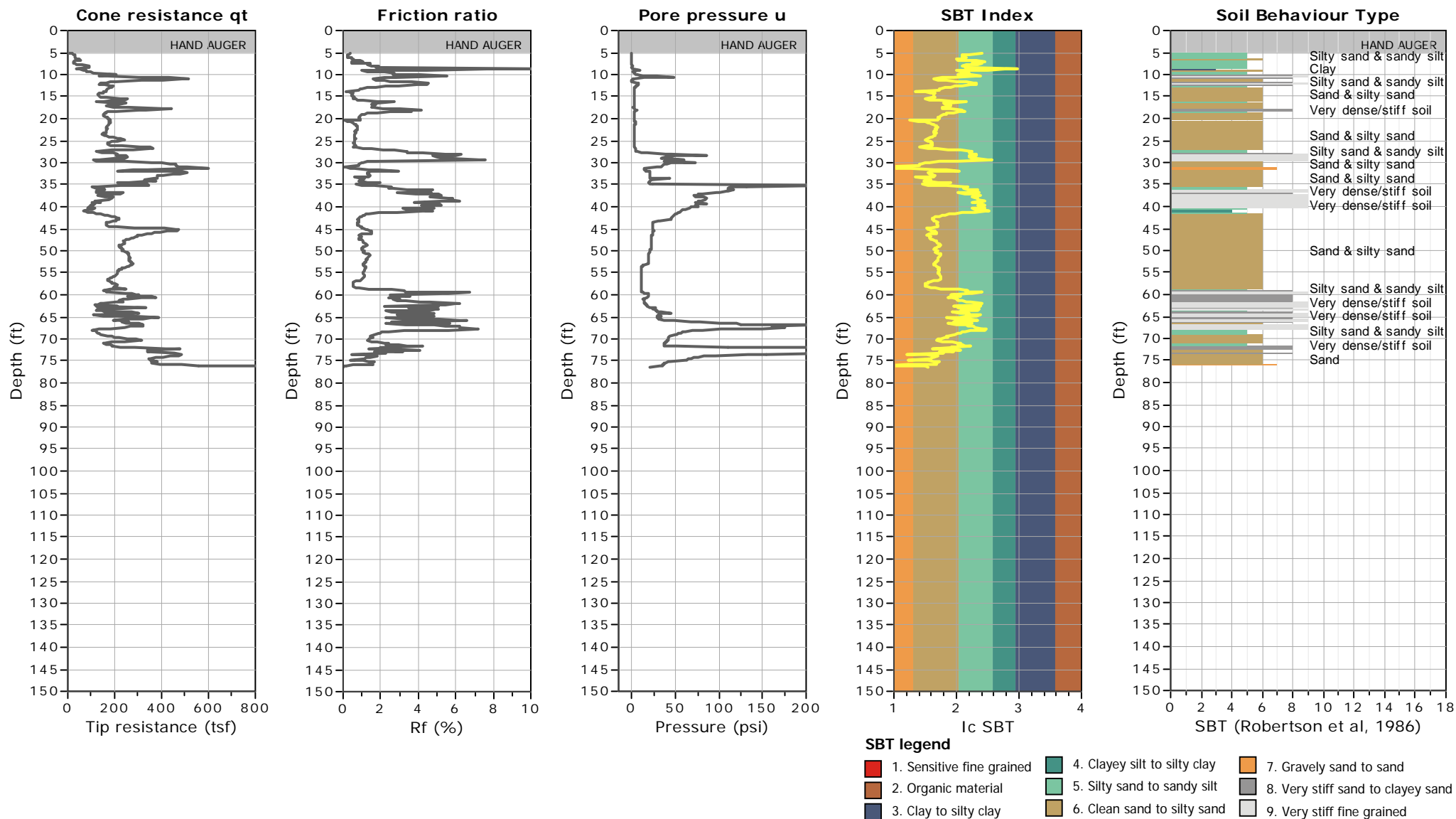


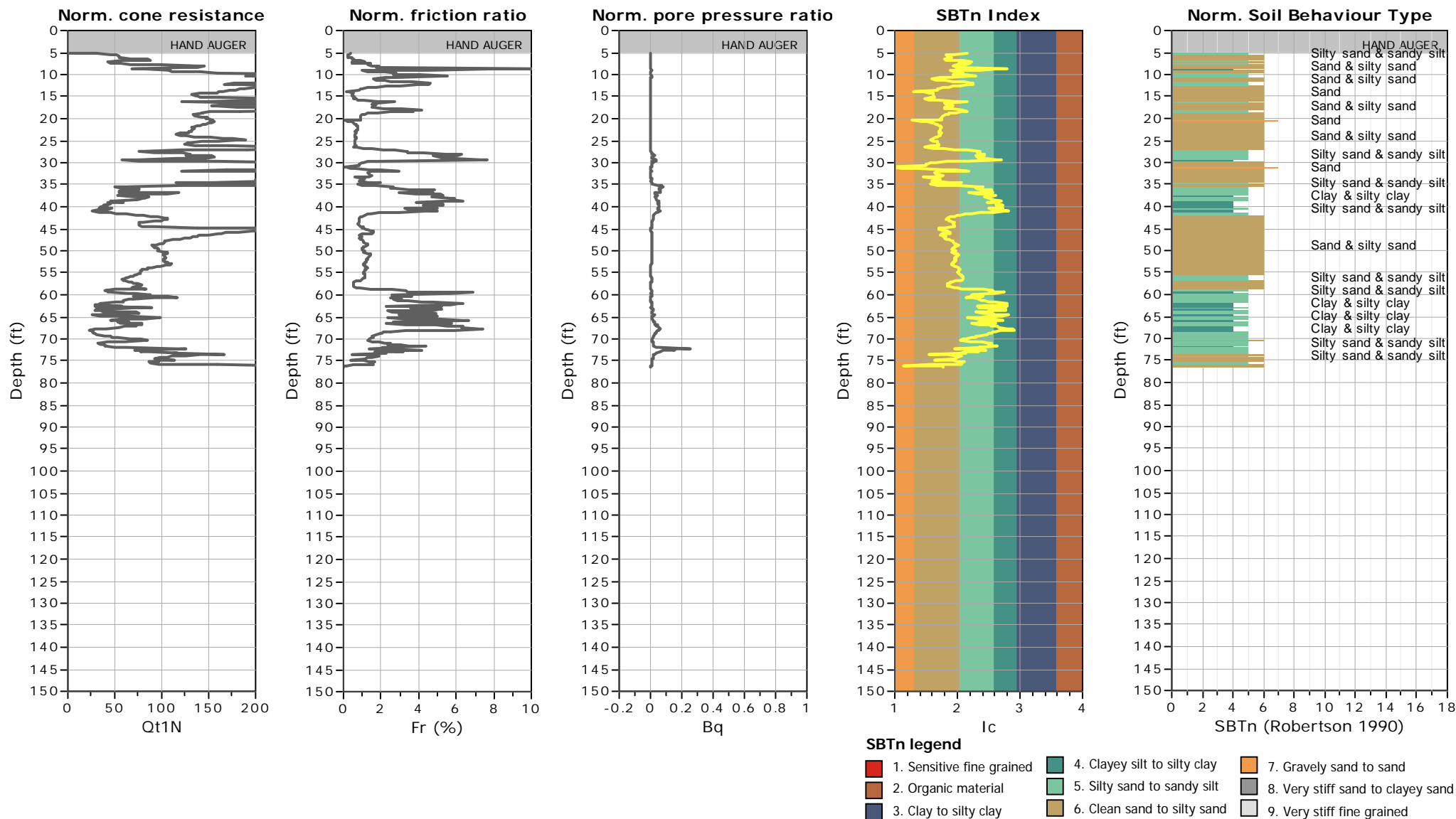
SBT - Bq plots (normalized)



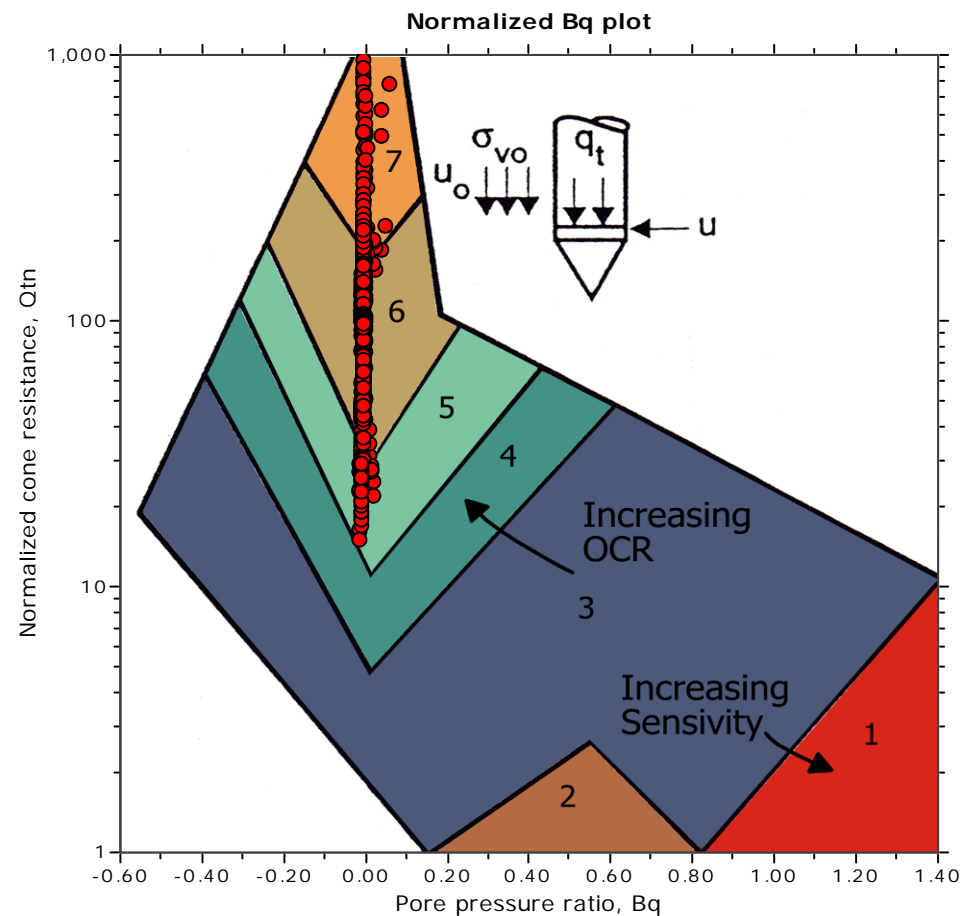
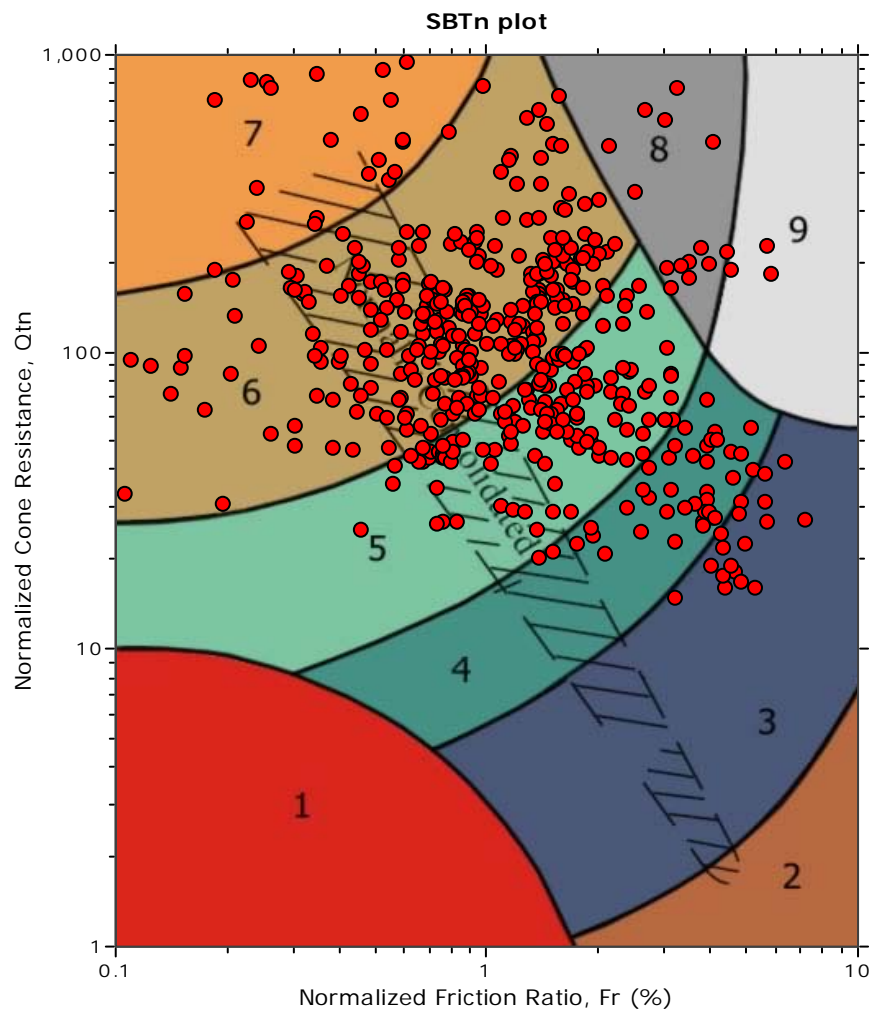
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



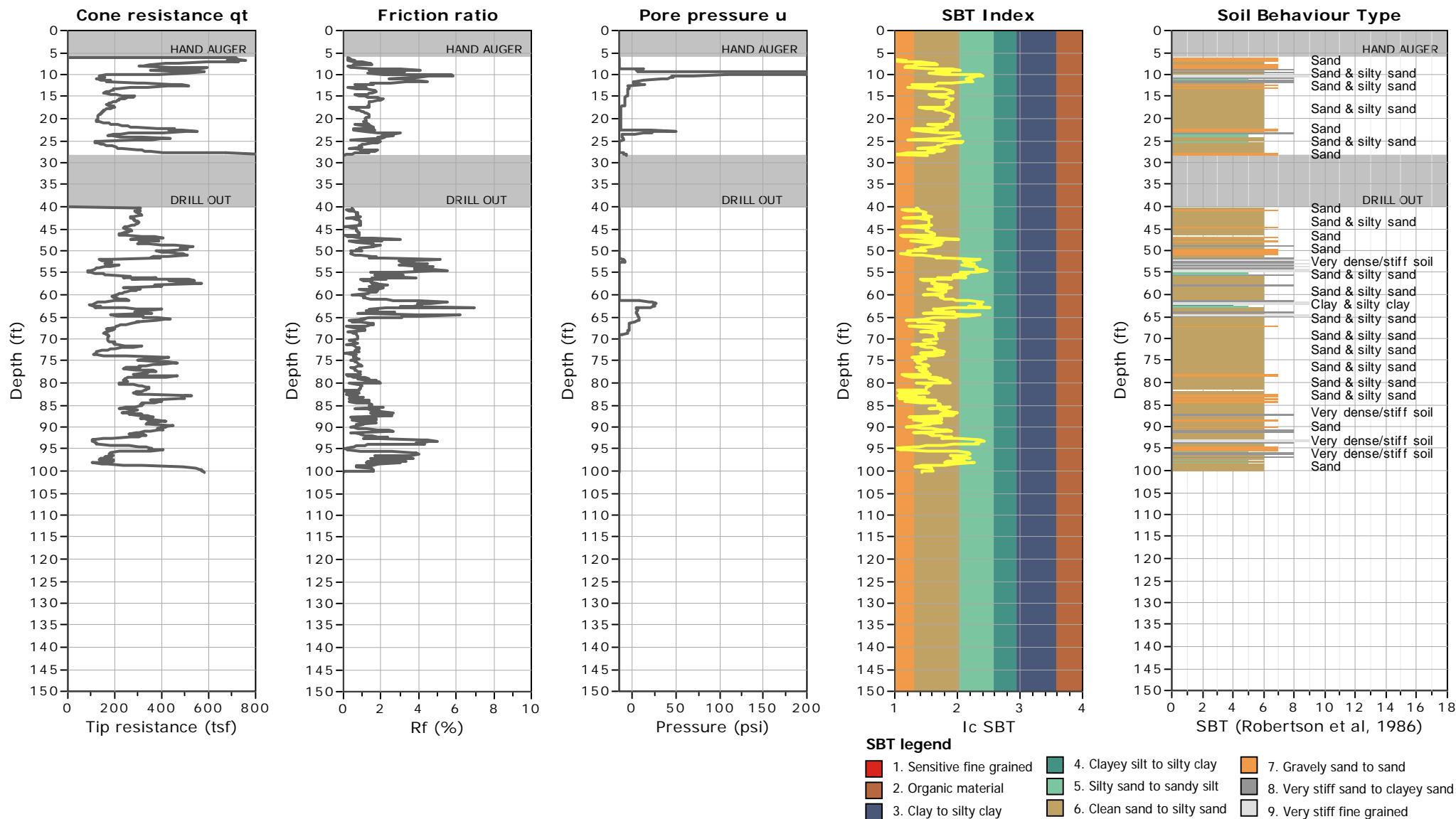


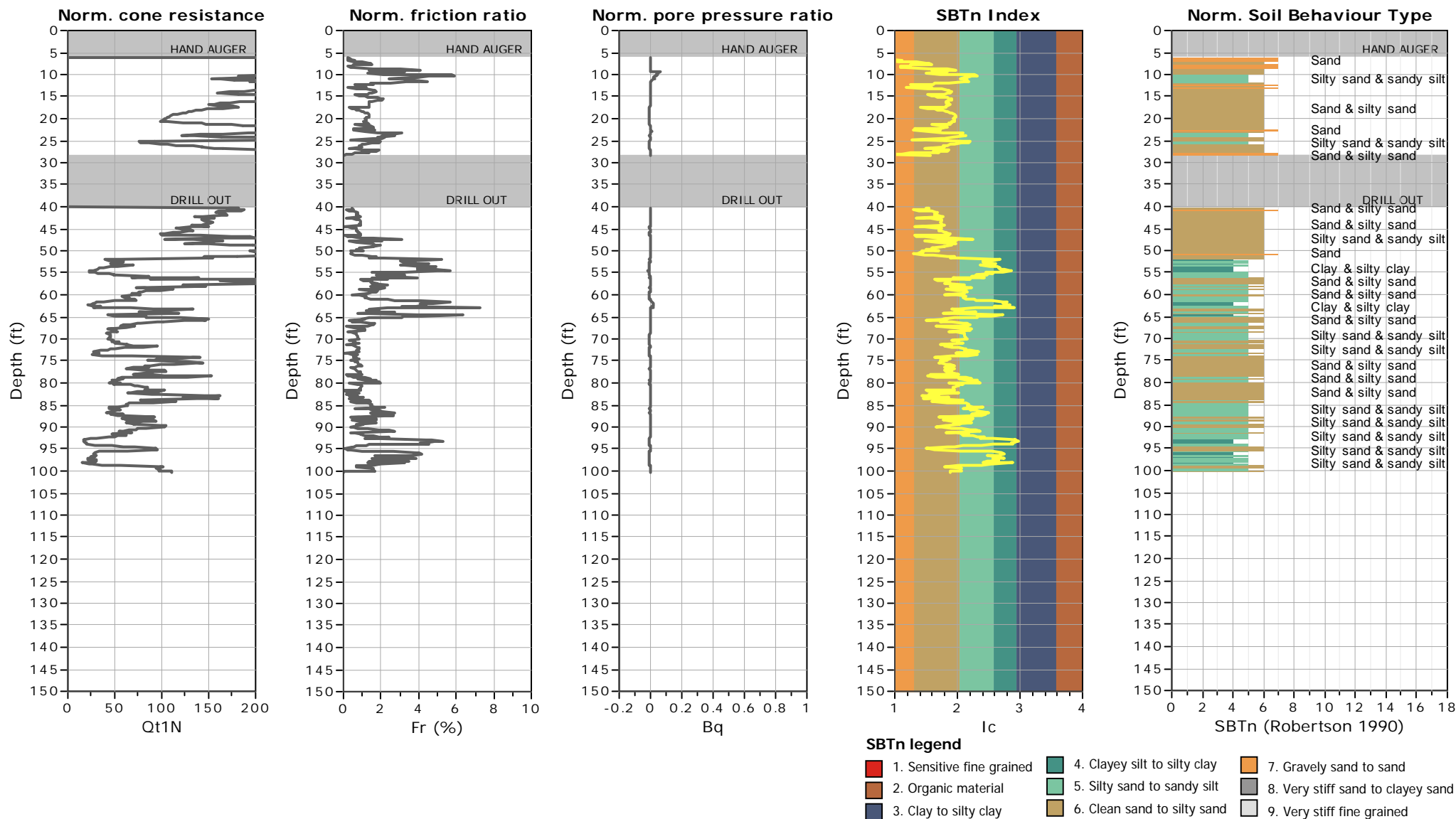
SBT - Bq plots (normalized)



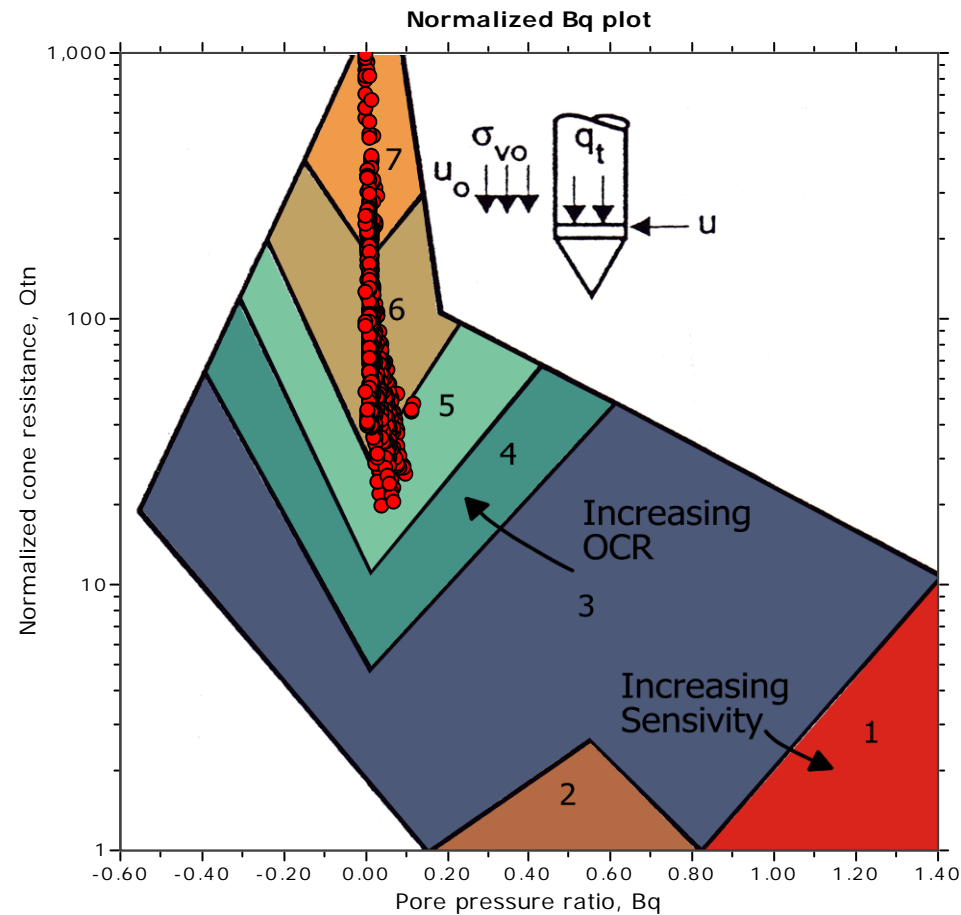
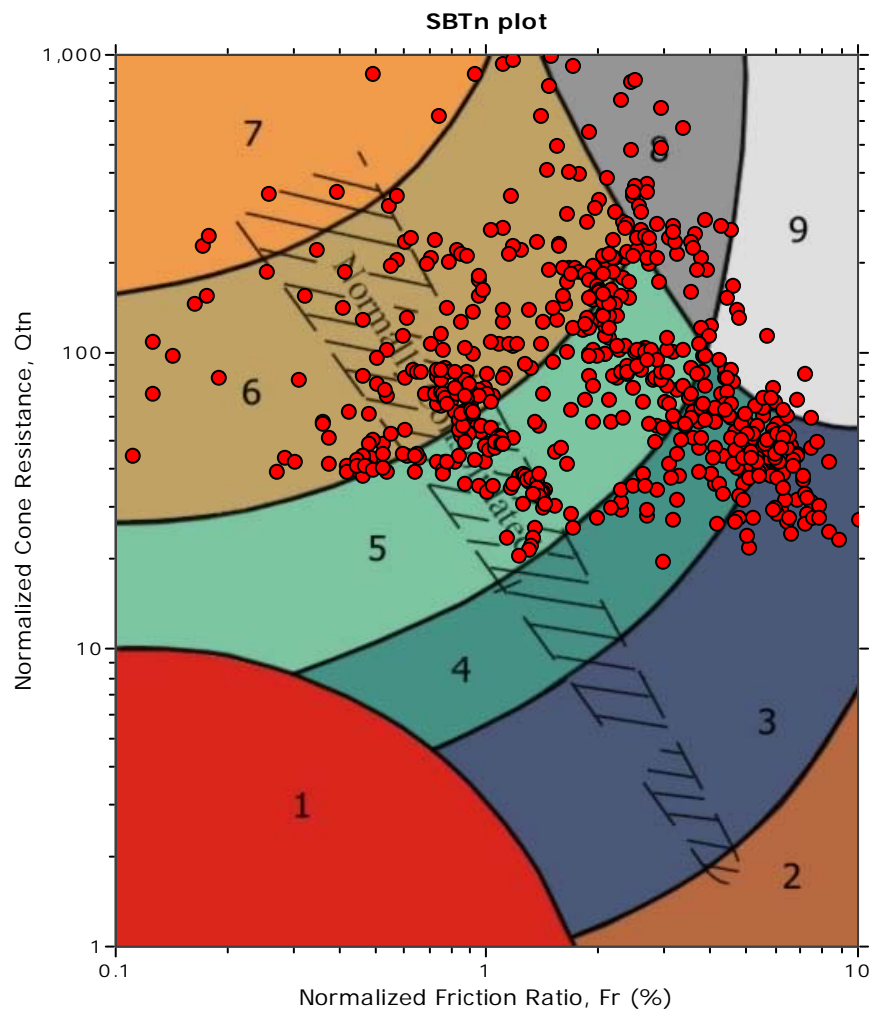
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



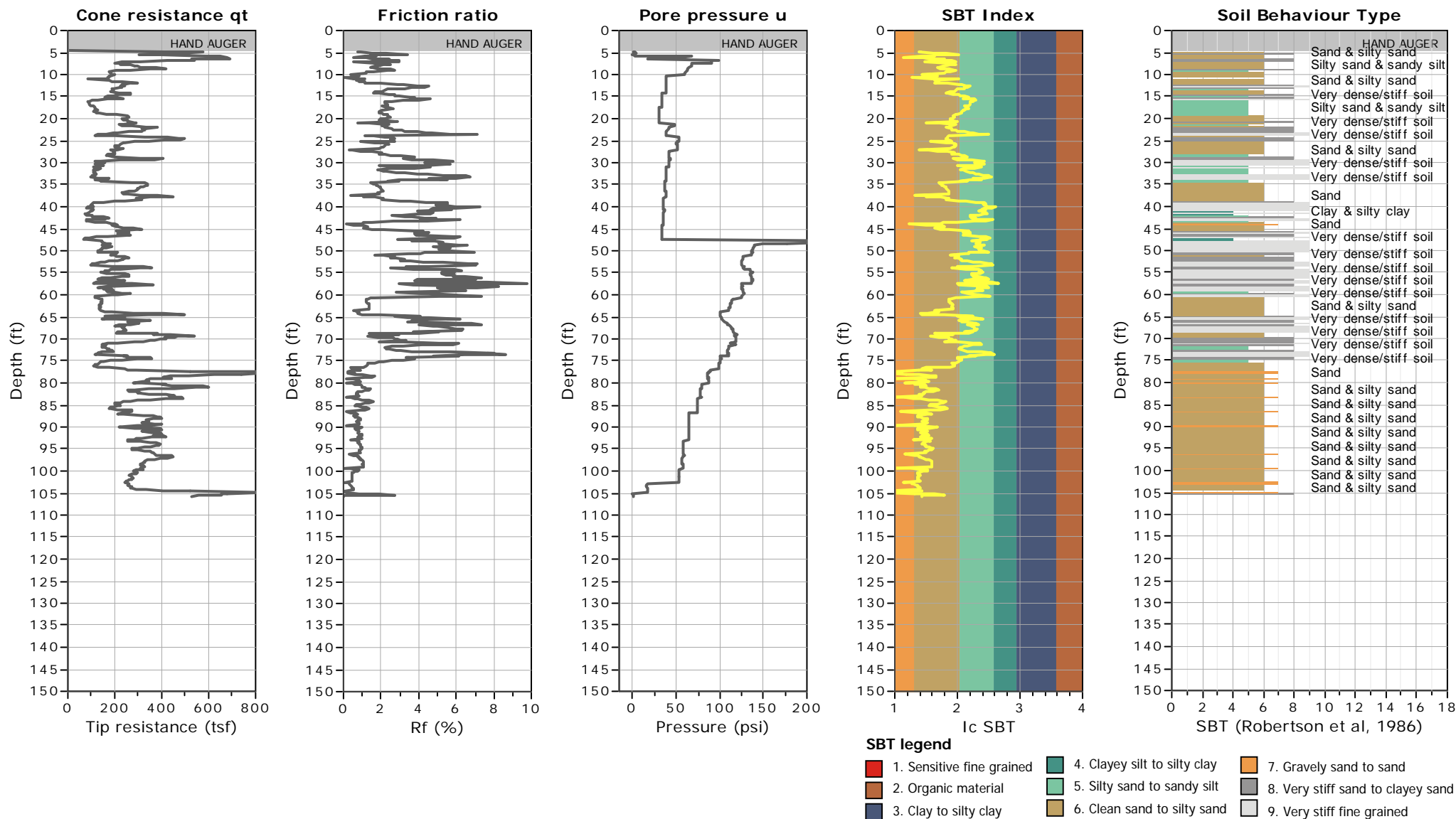


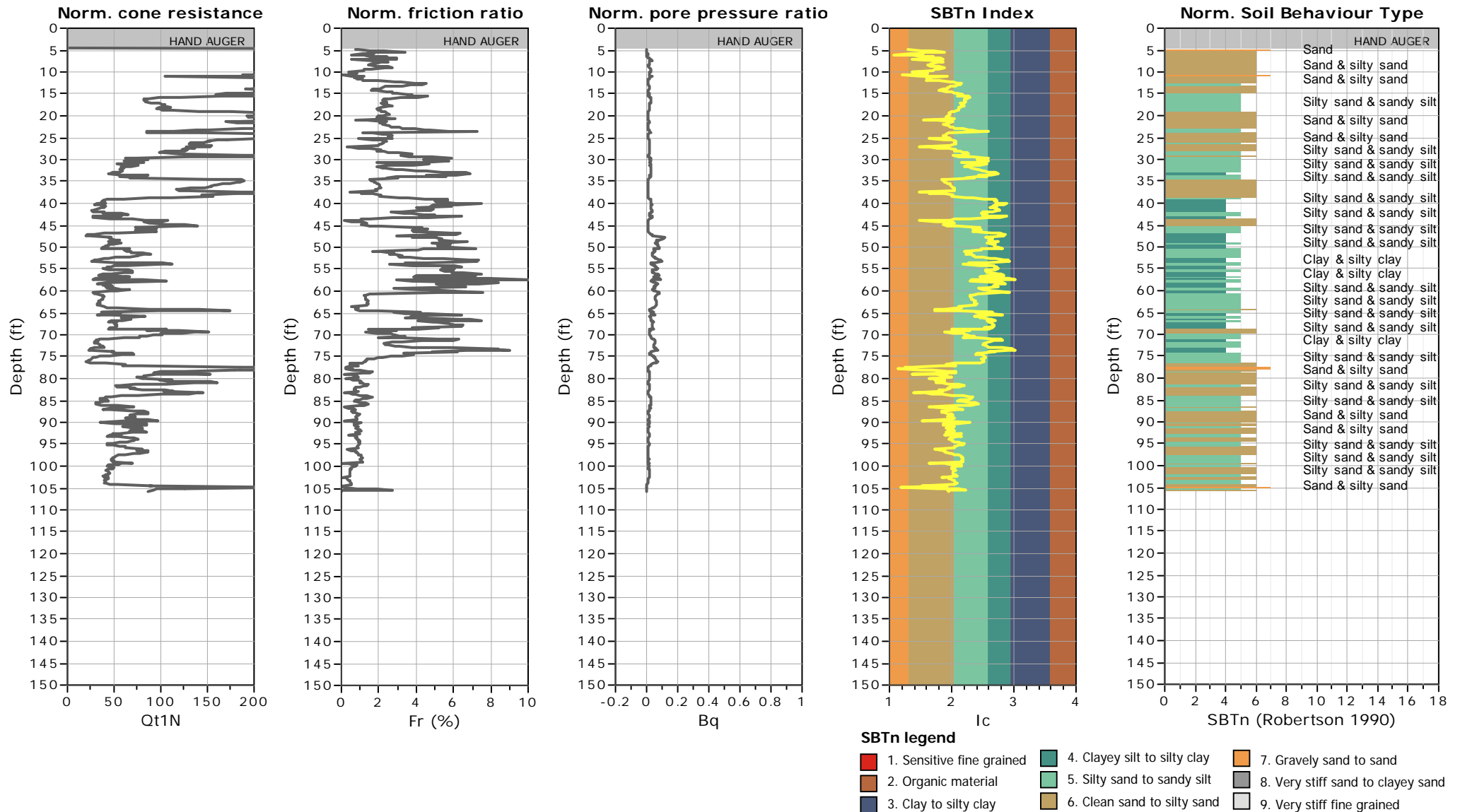
SBT - Bq plots (normalized)



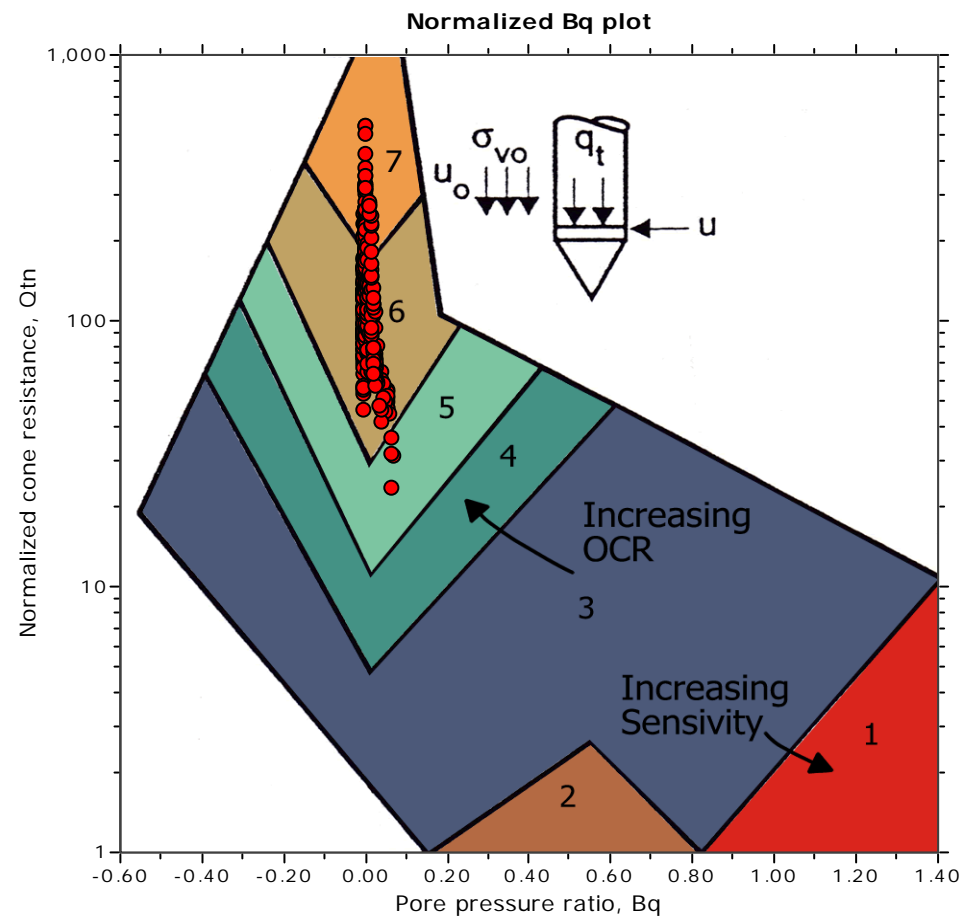
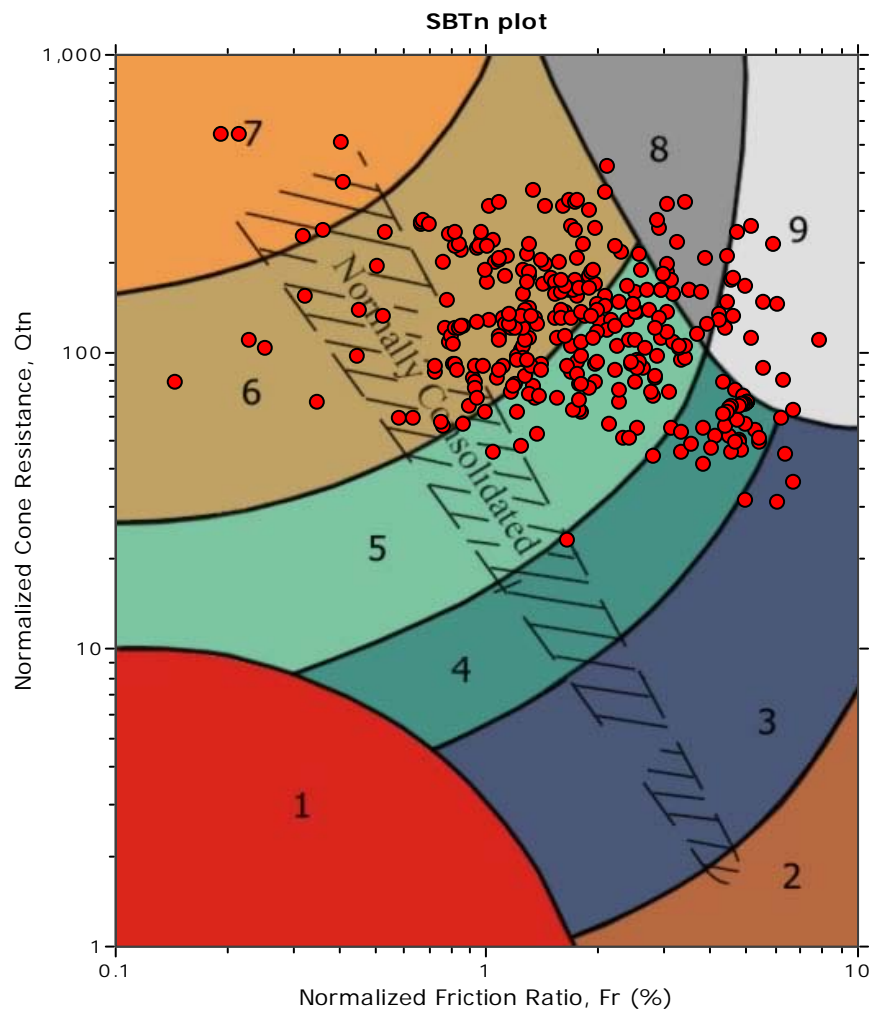
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



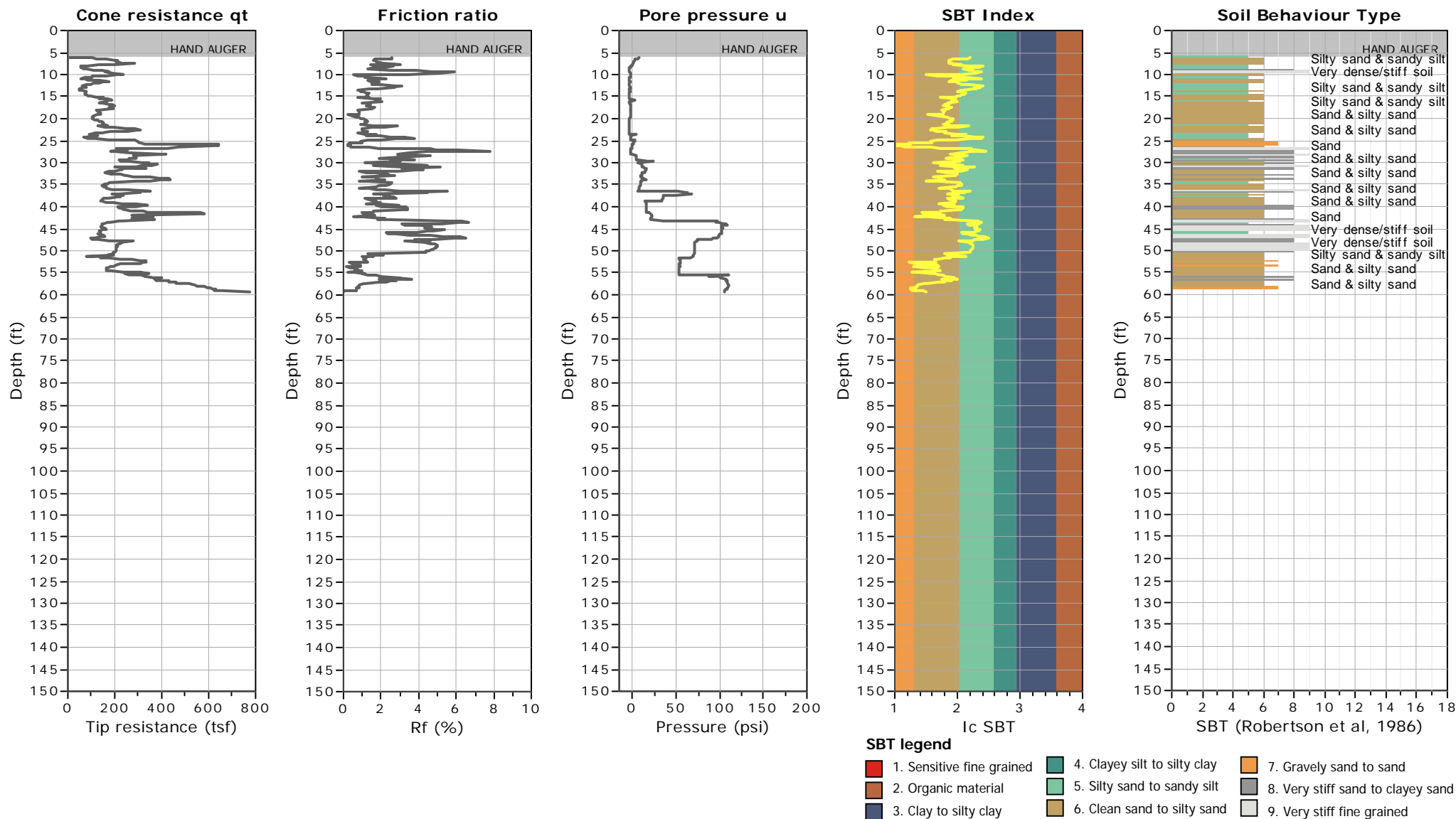


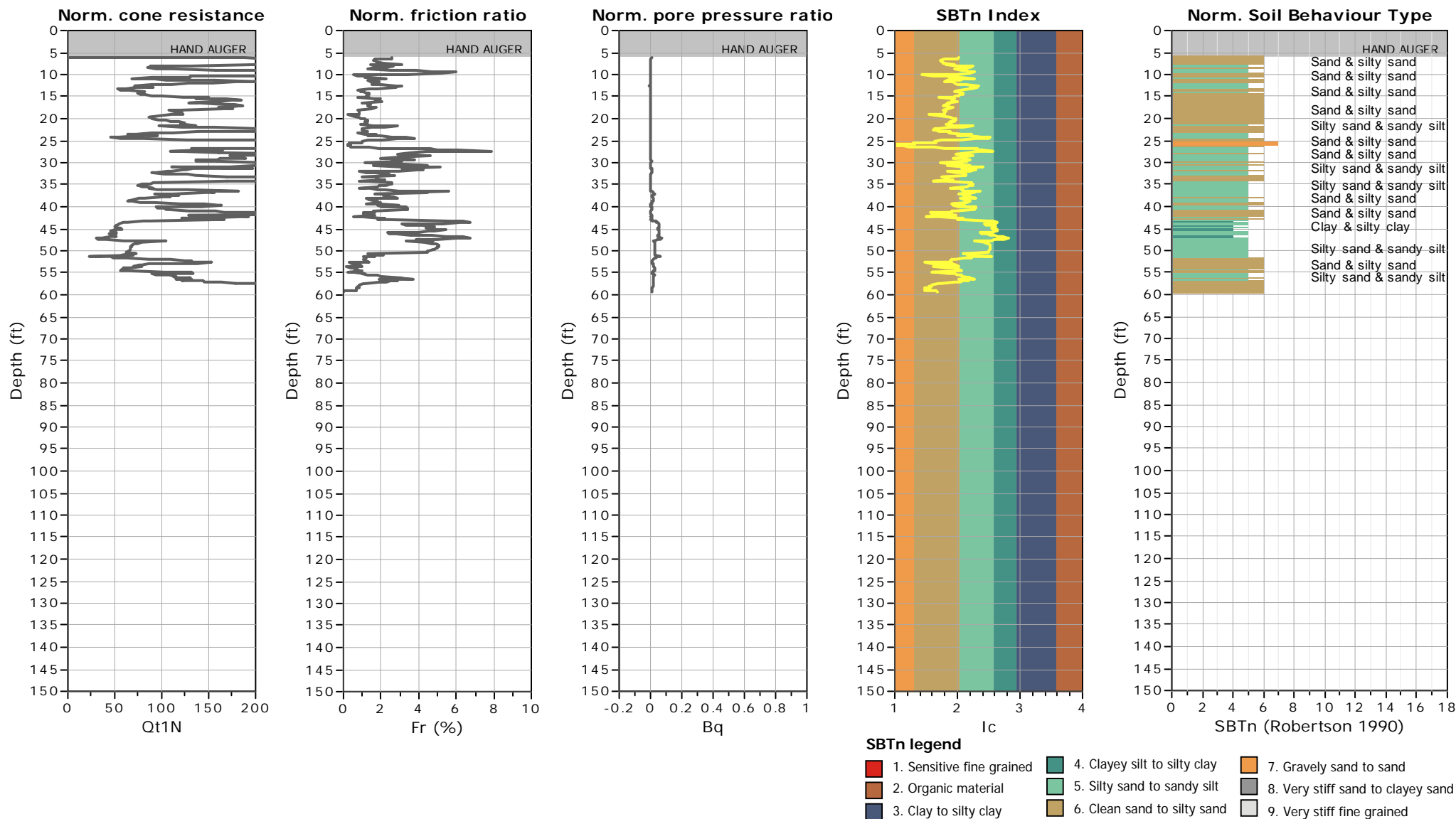
SBT - Bq plots (normalized)



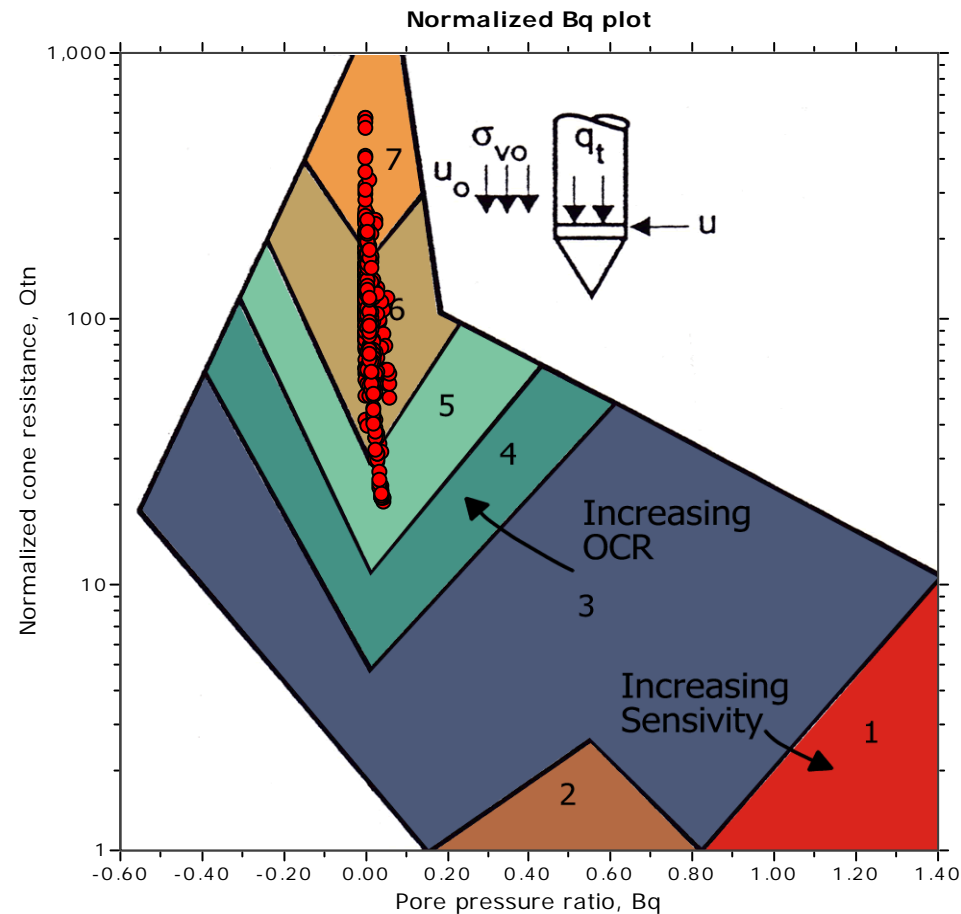
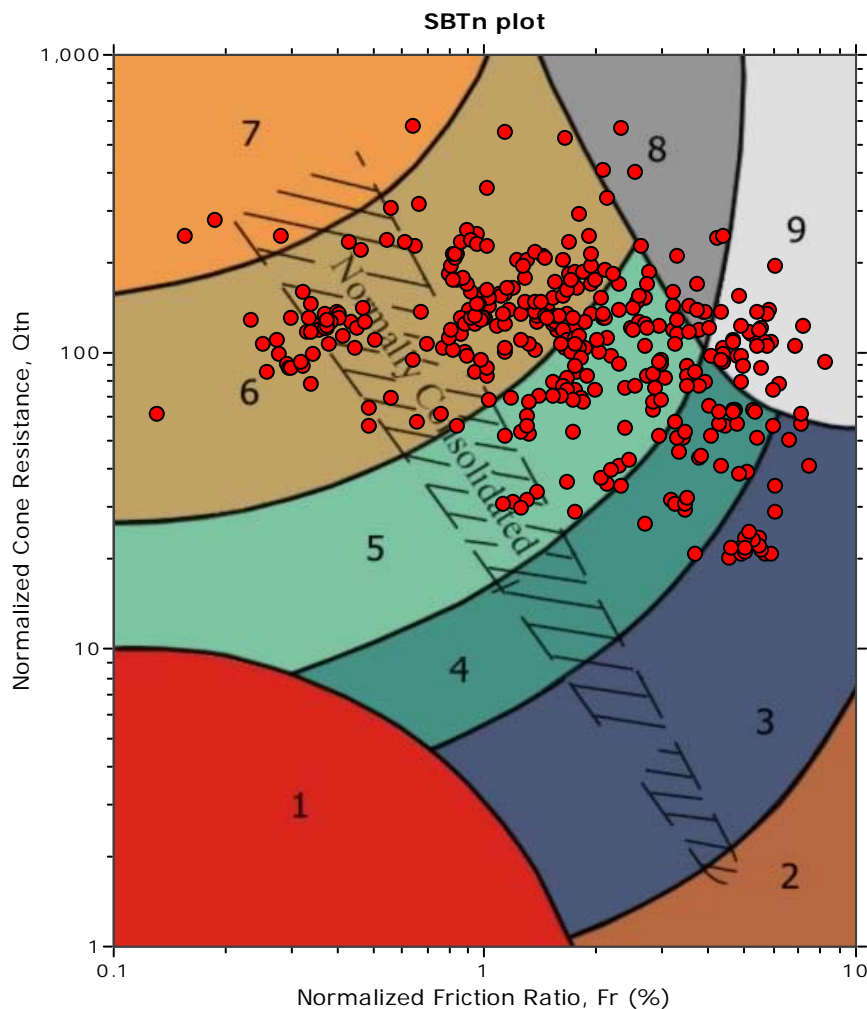
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



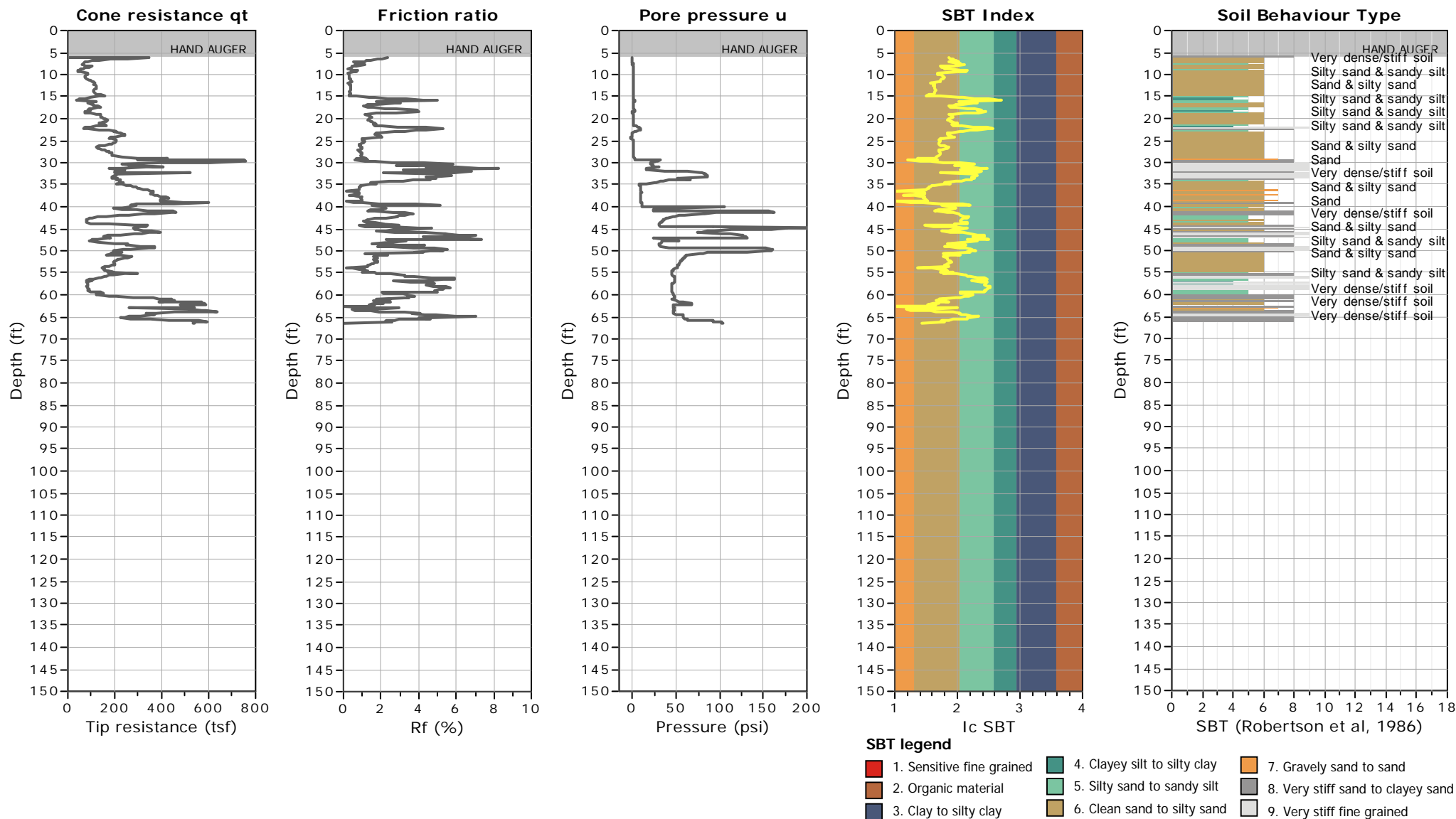


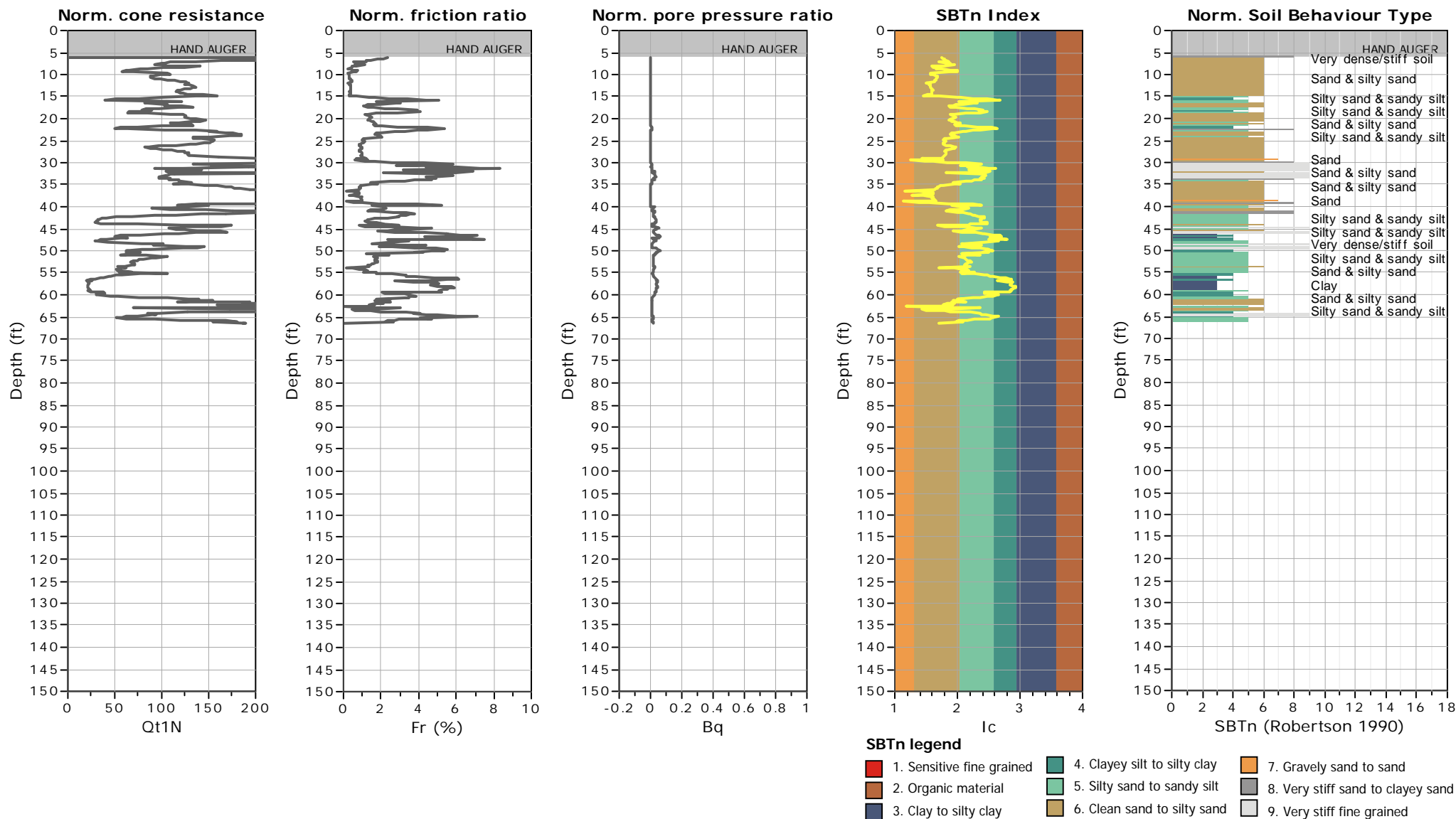
SBT - Bq plots (normalized)



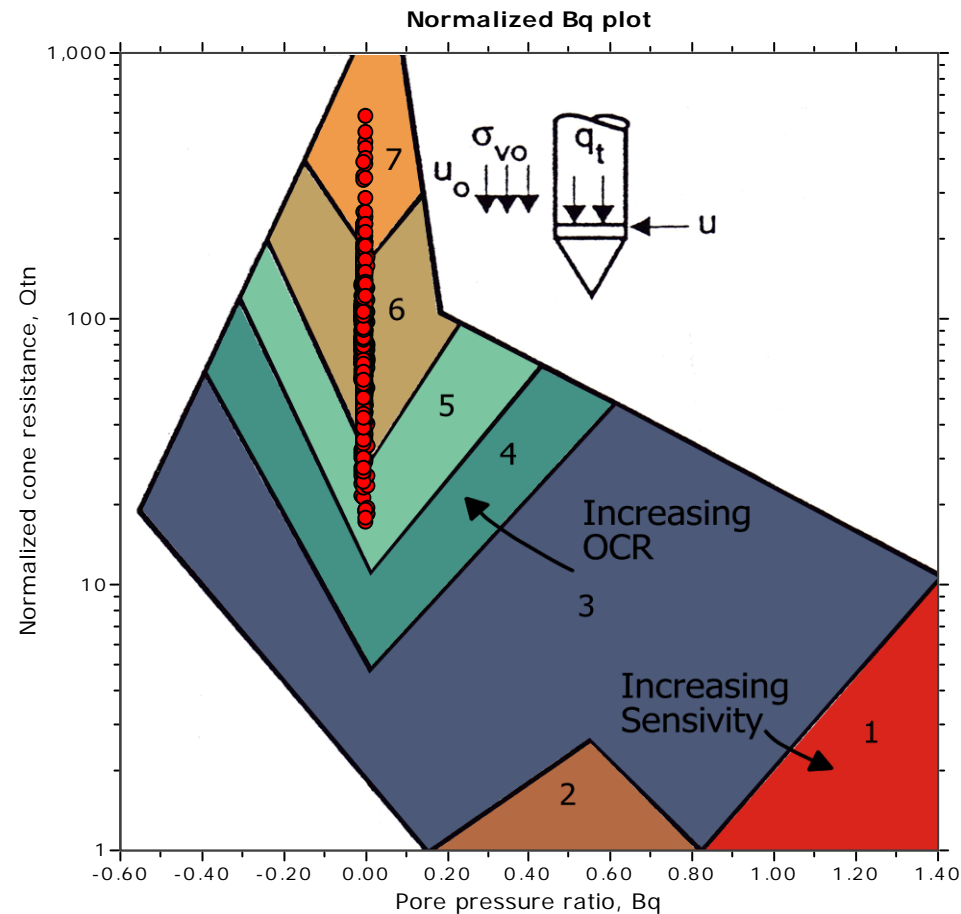
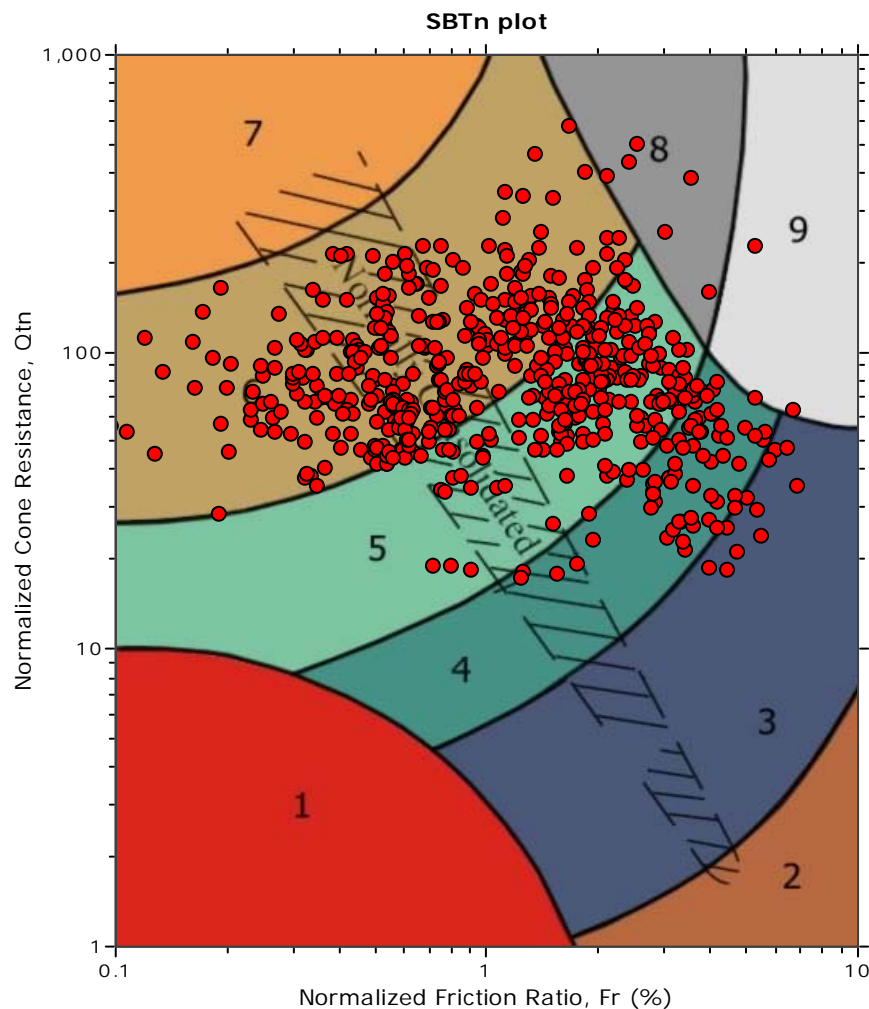
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



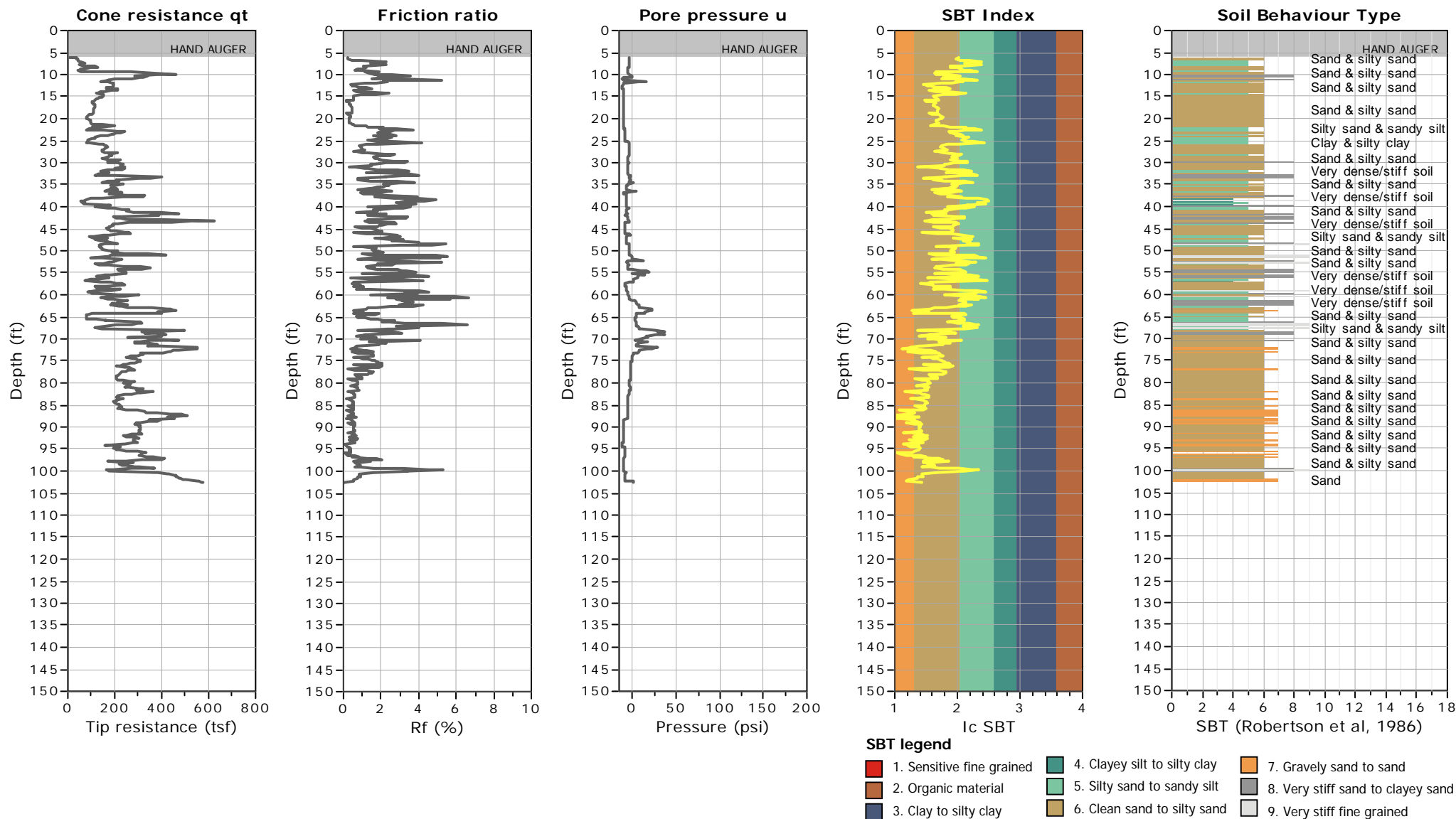


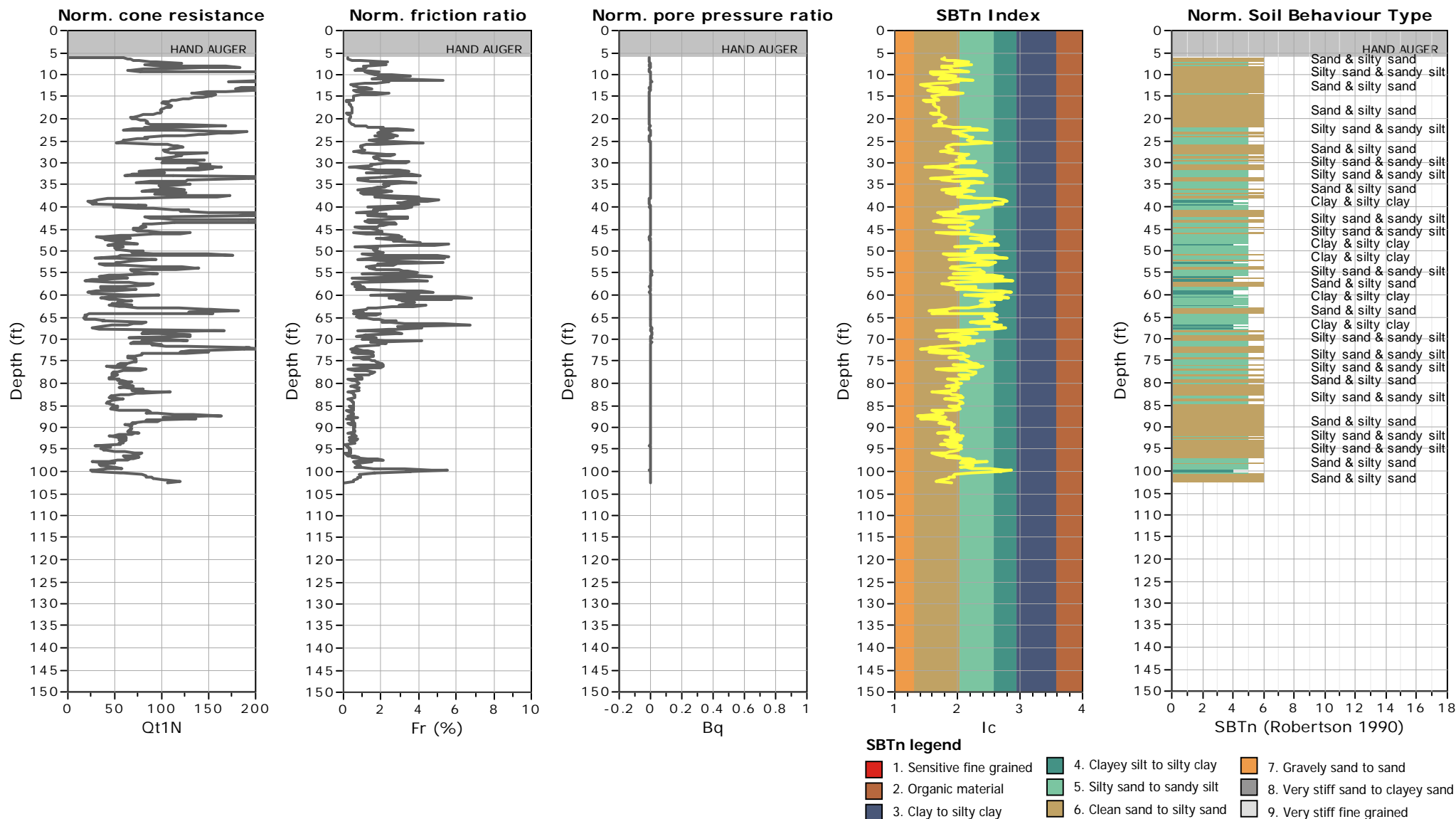
SBT - Bq plots (normalized)



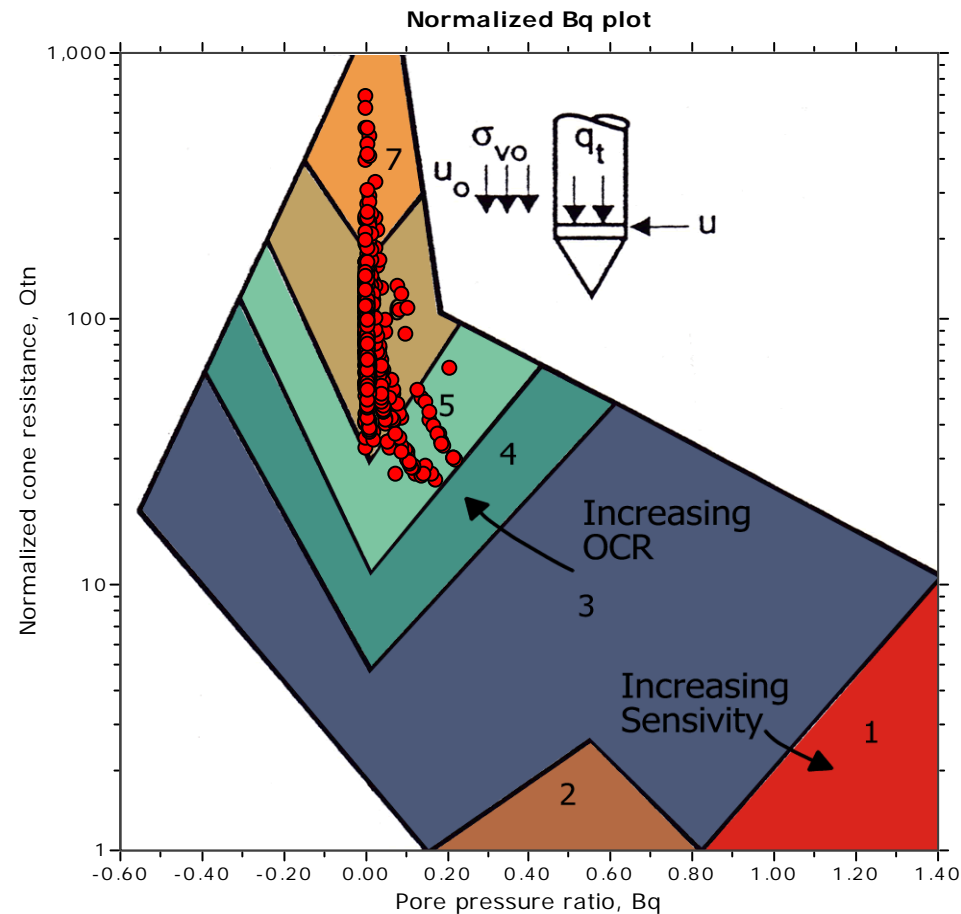
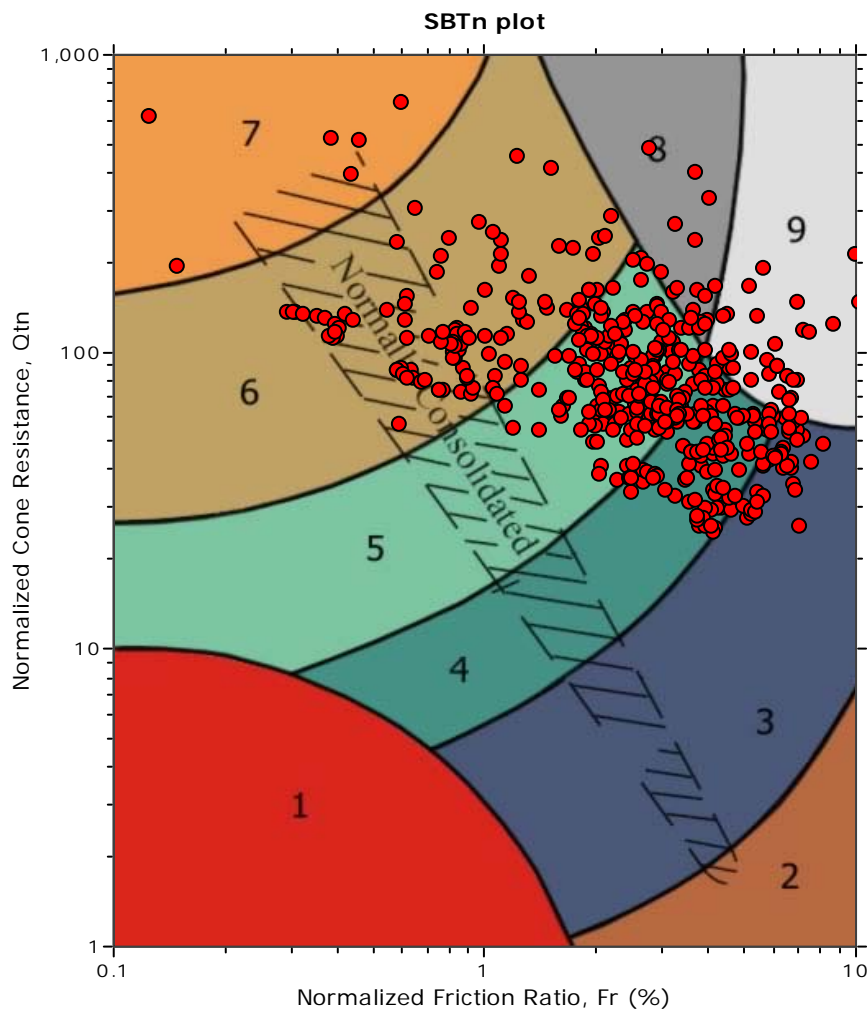
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



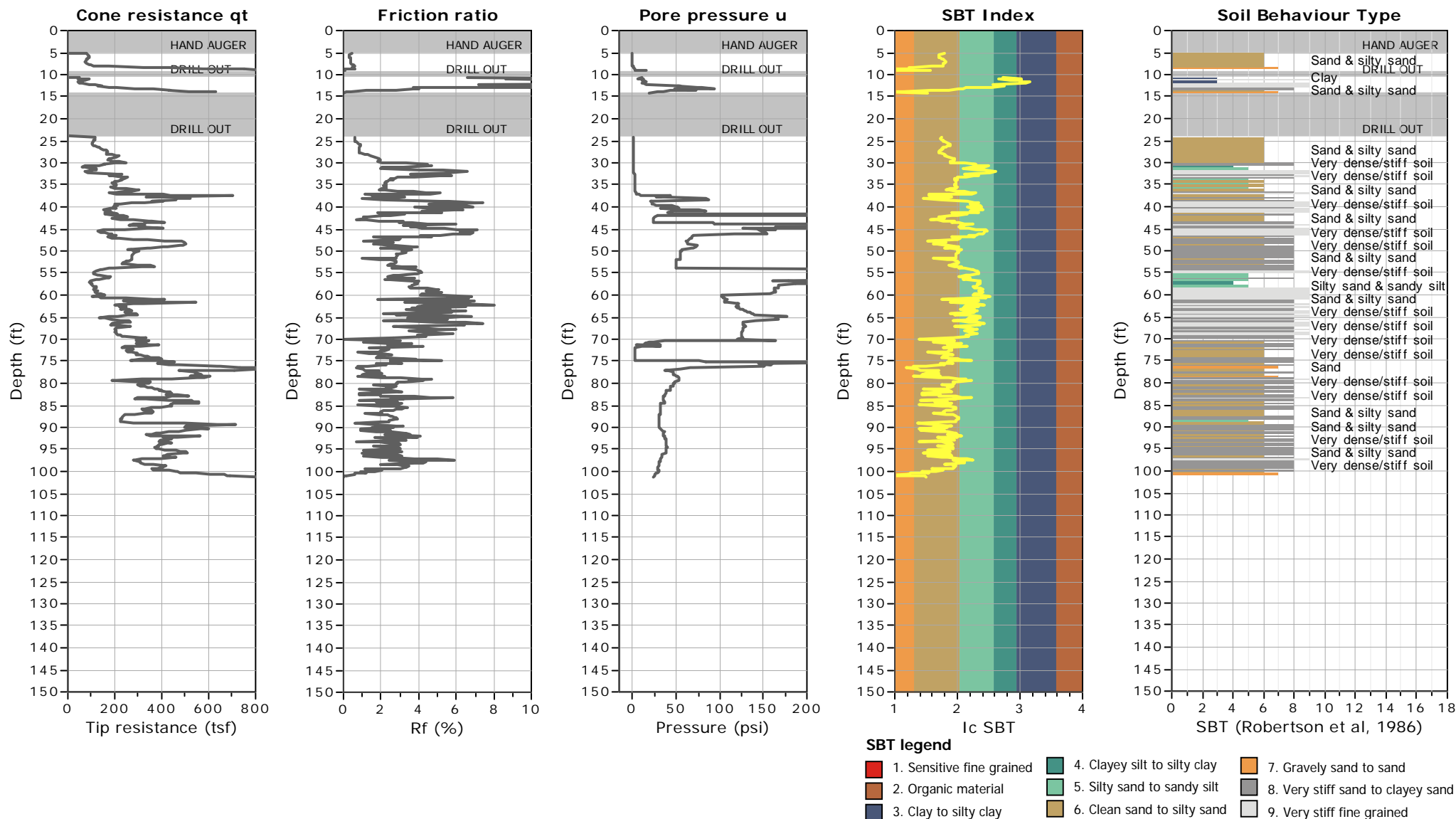


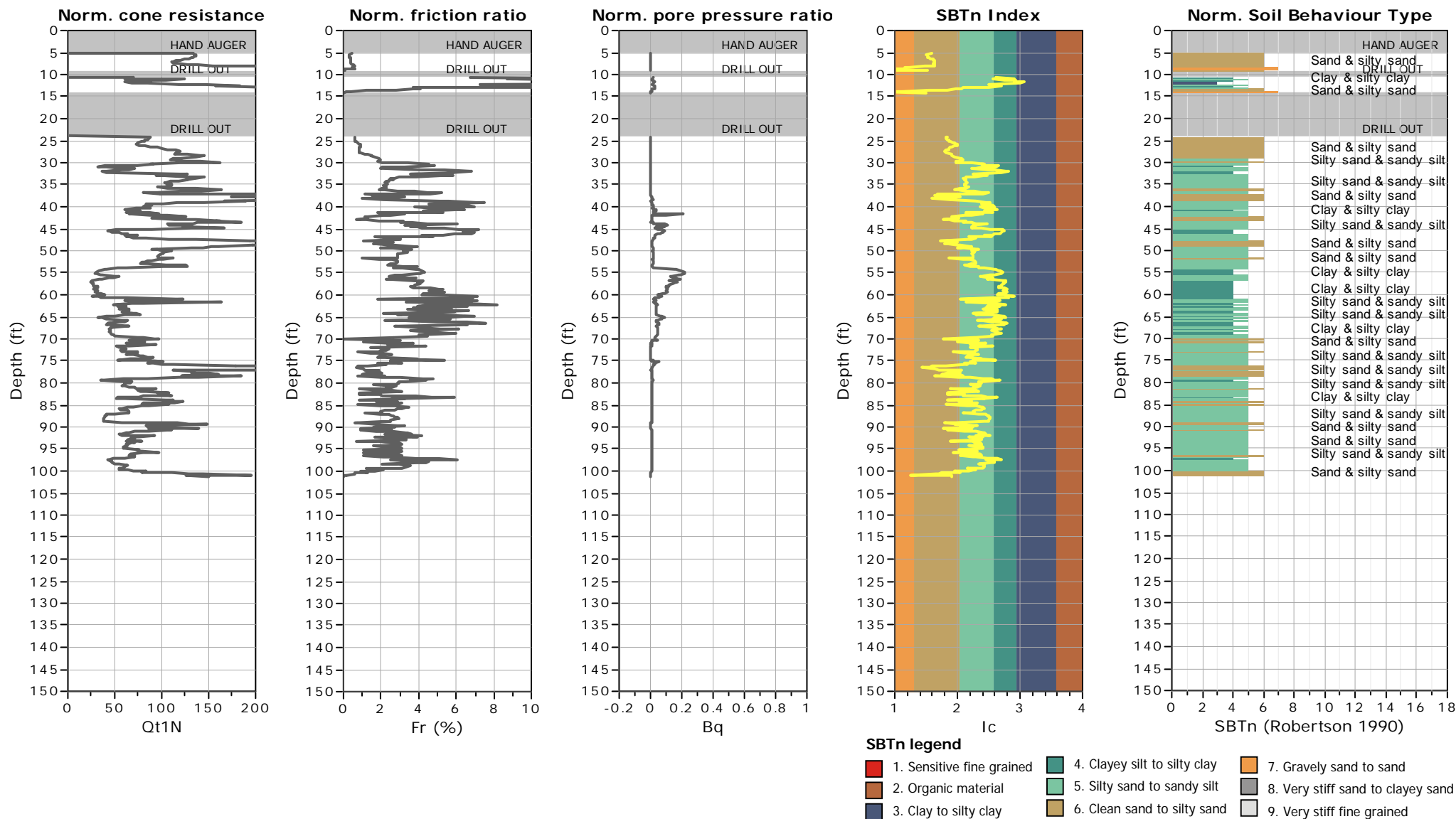
SBT - Bq plots (normalized)



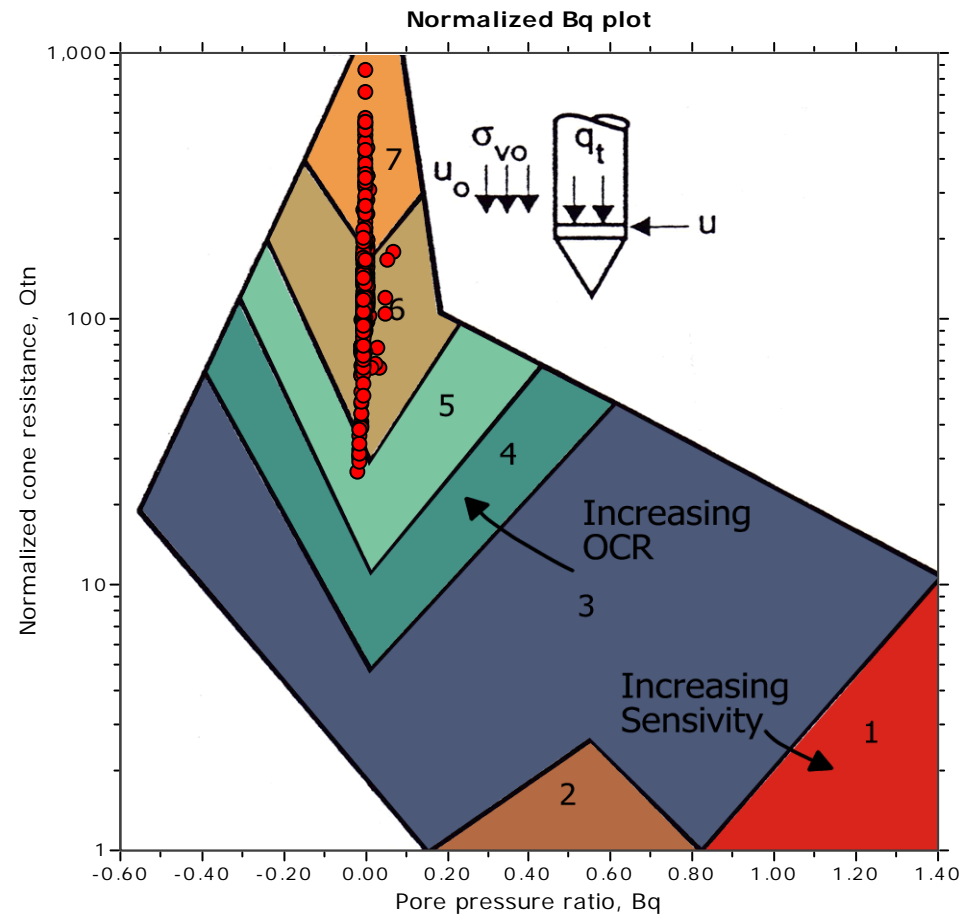
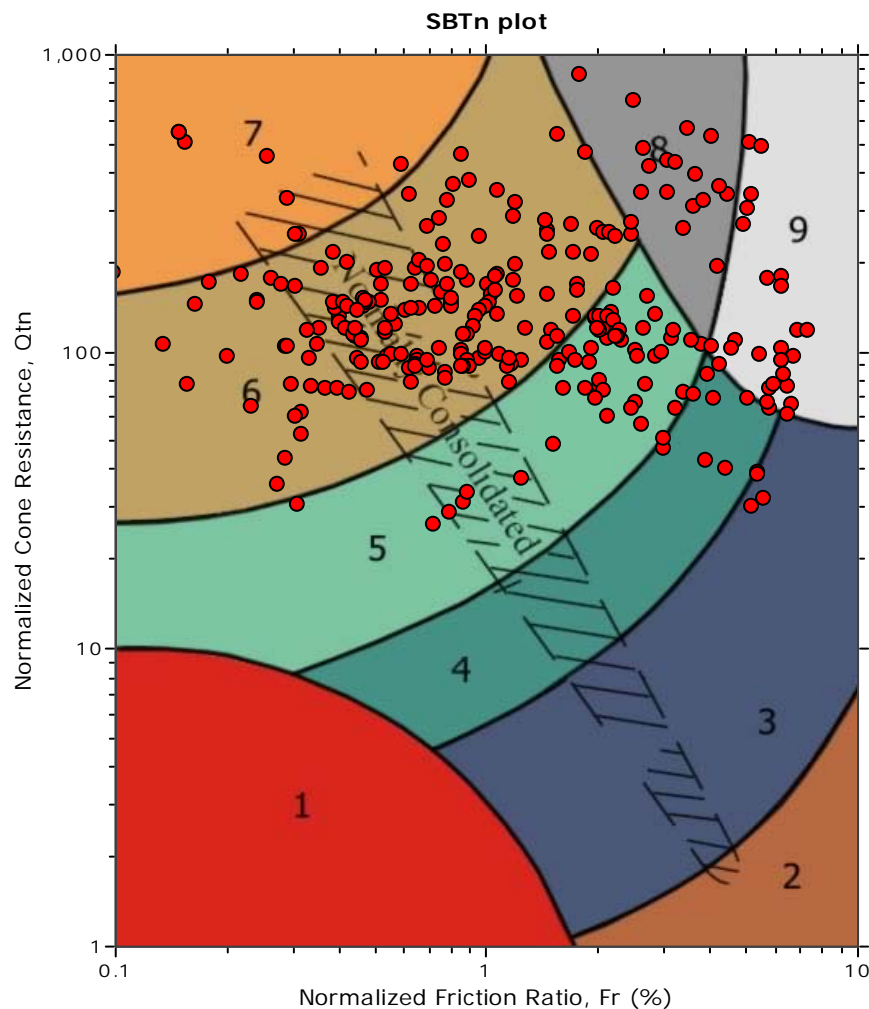
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



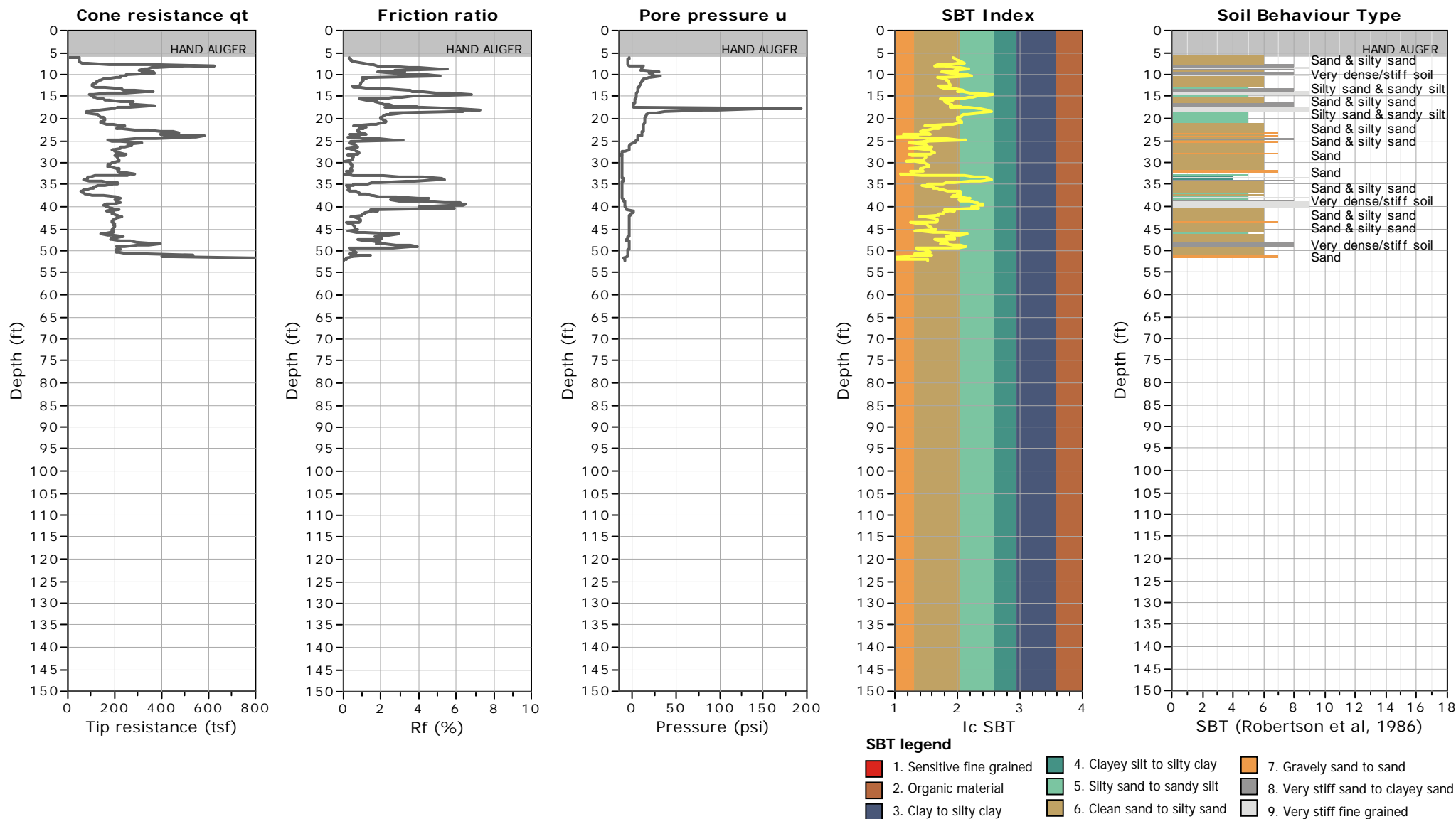


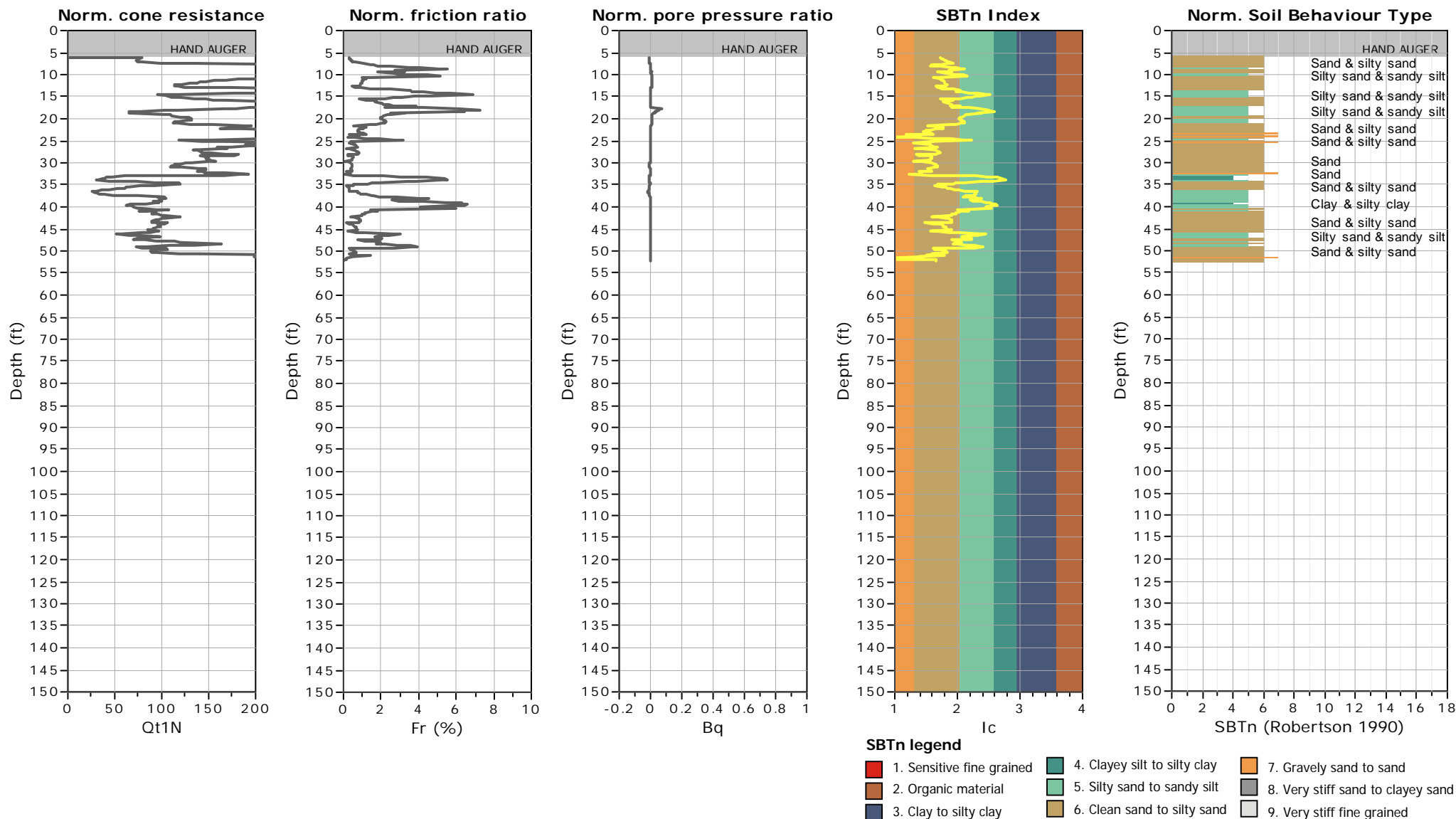
SBT - Bq plots (normalized)



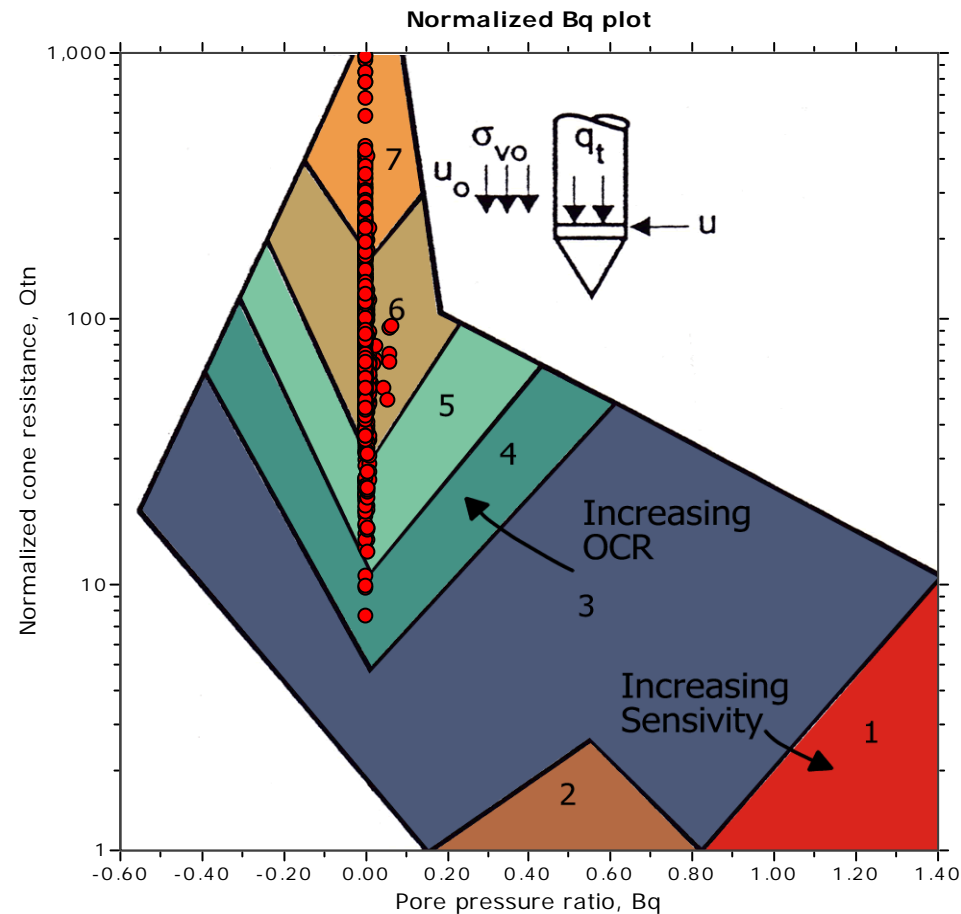
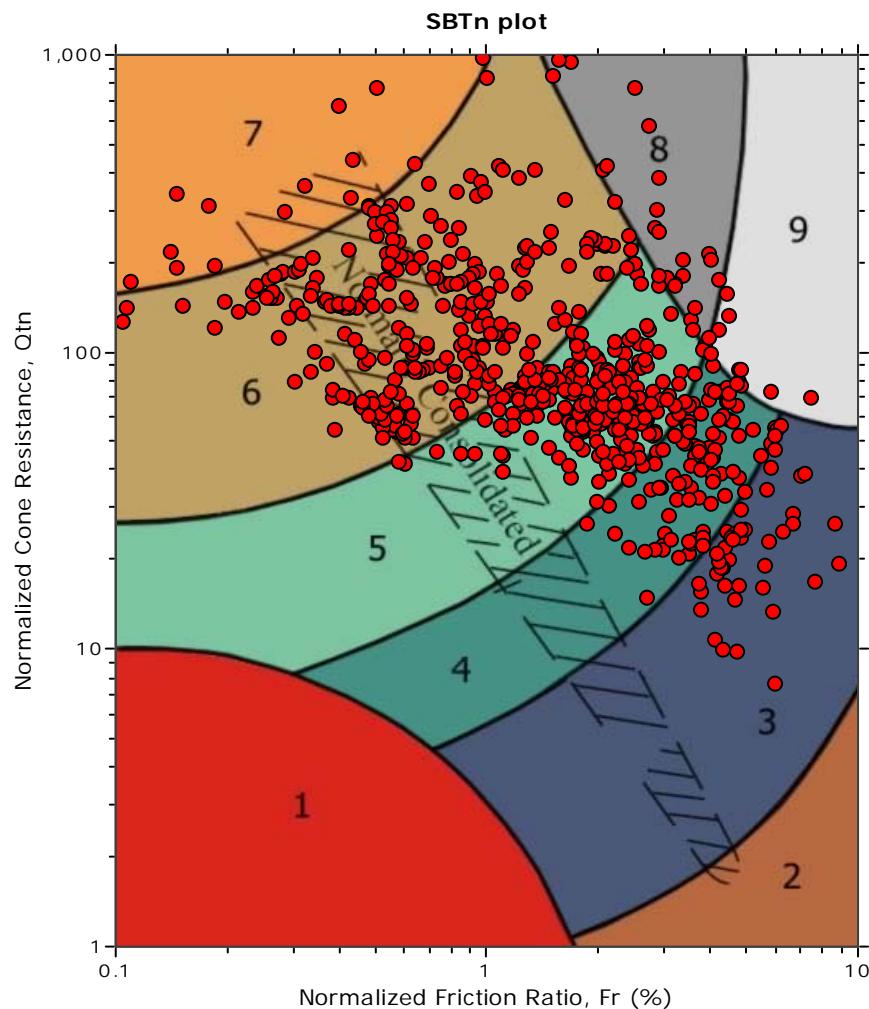
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



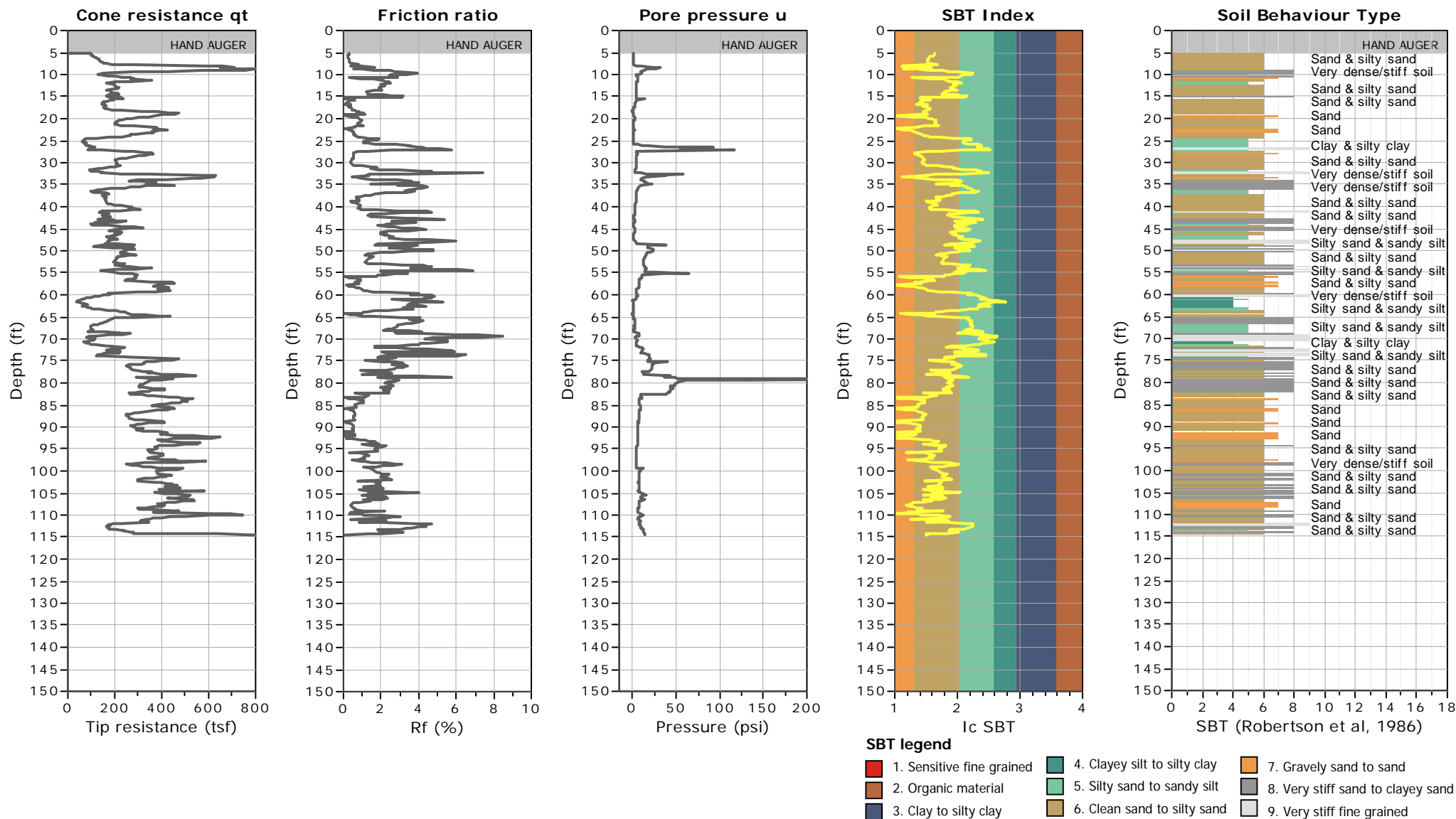


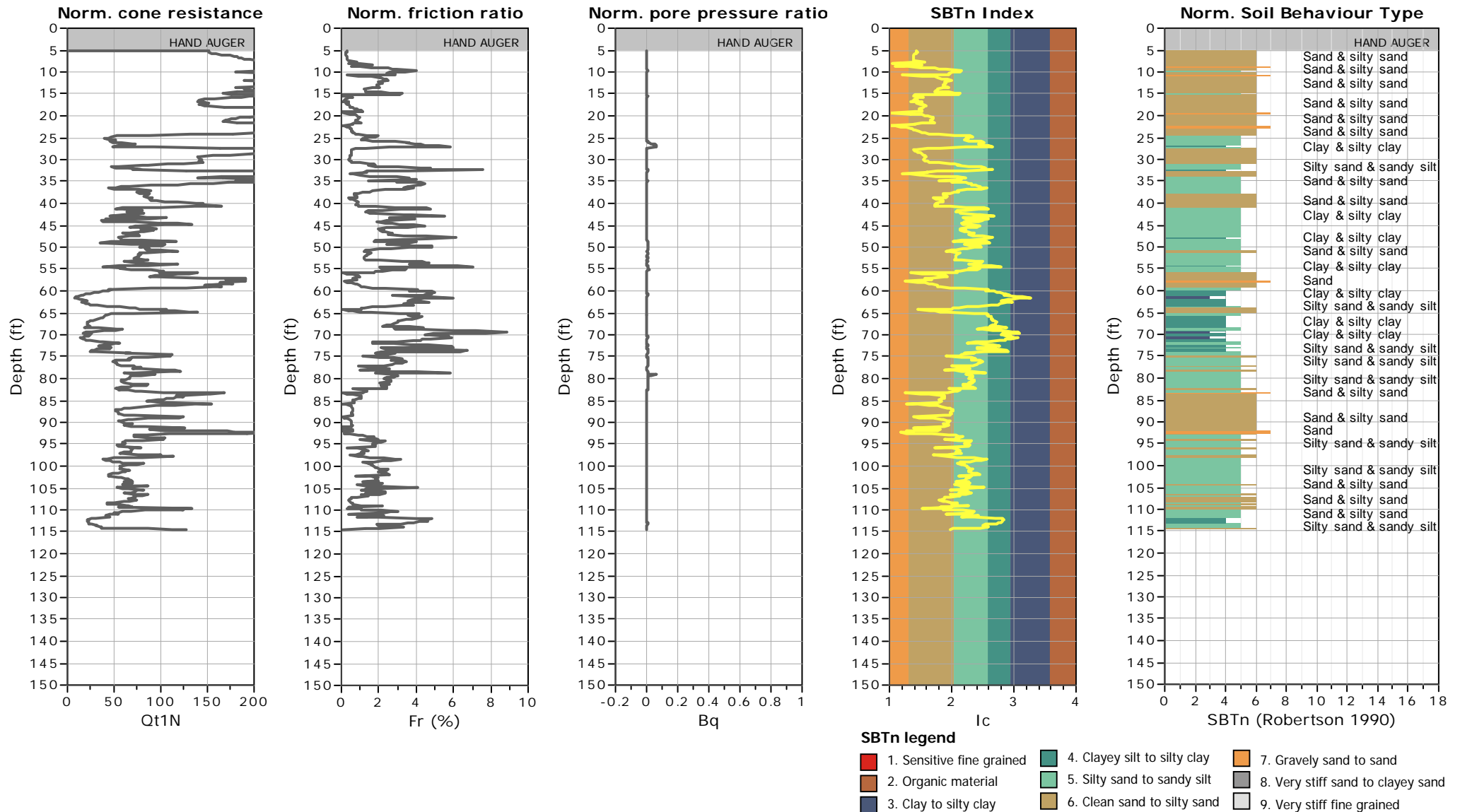
SBT - Bq plots (normalized)



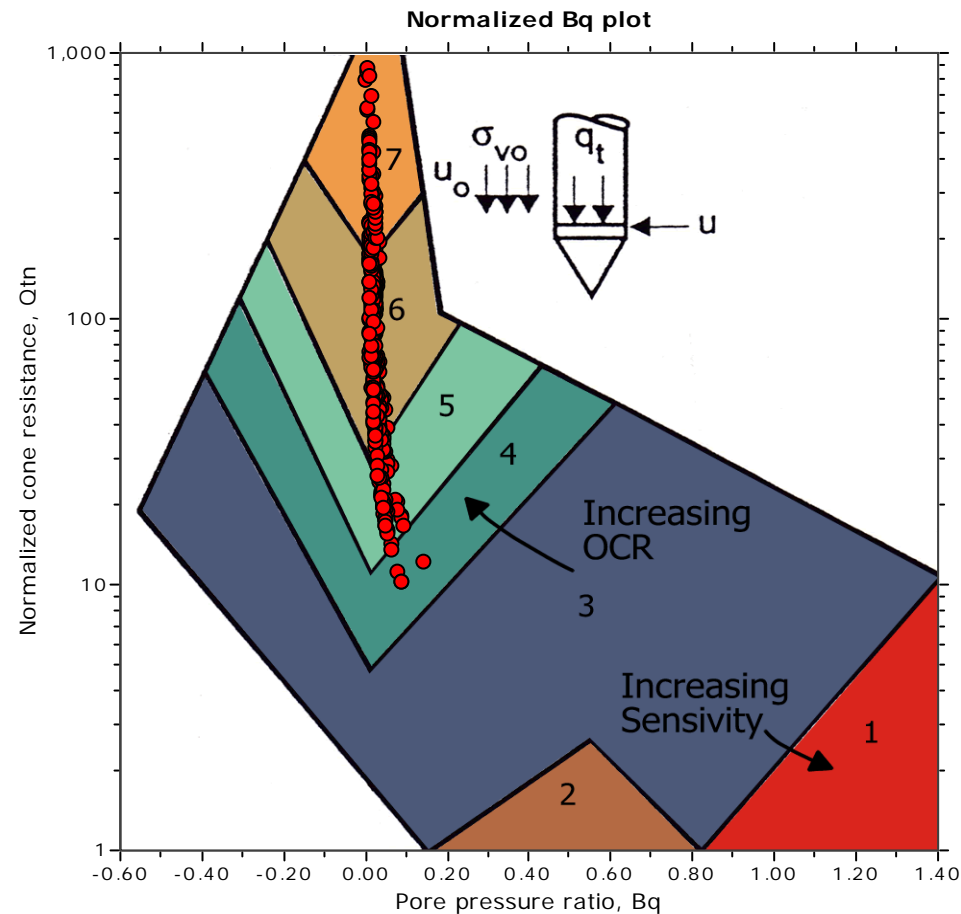
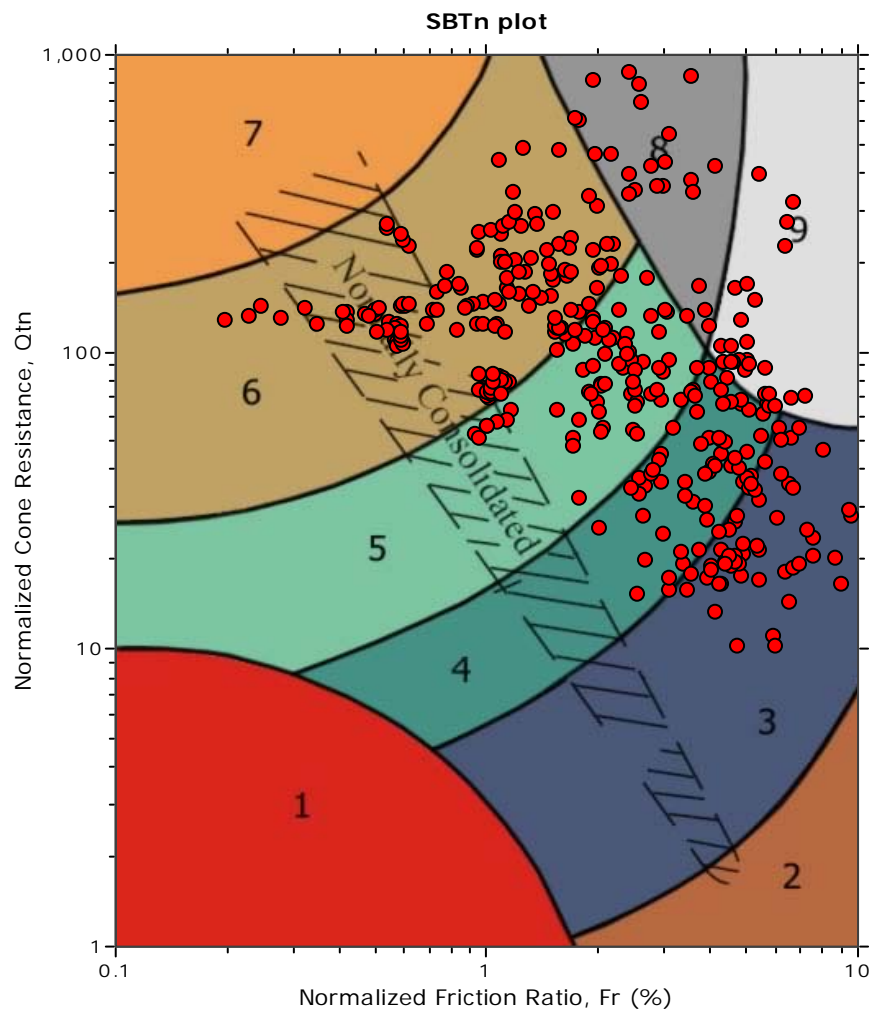
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



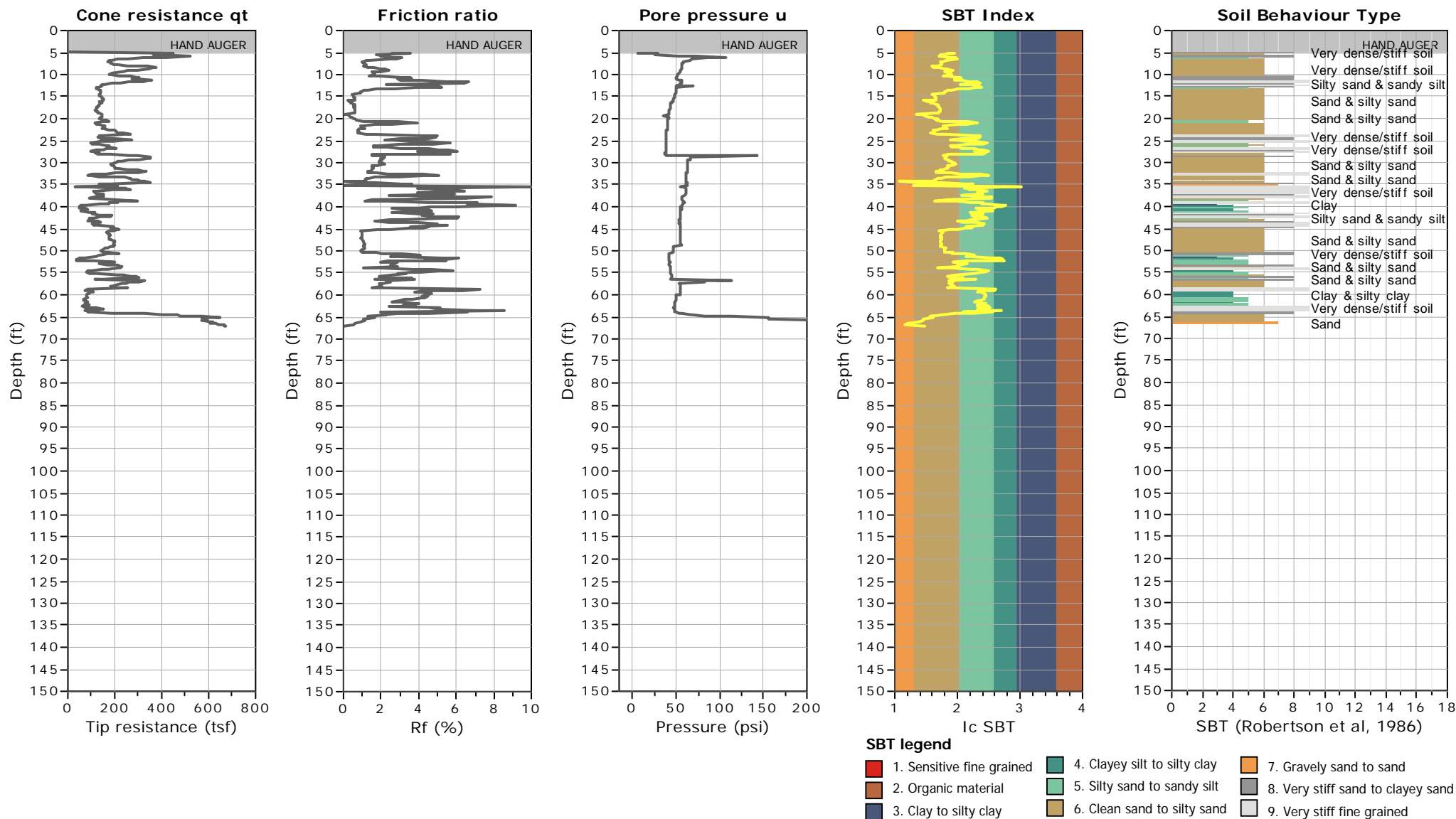


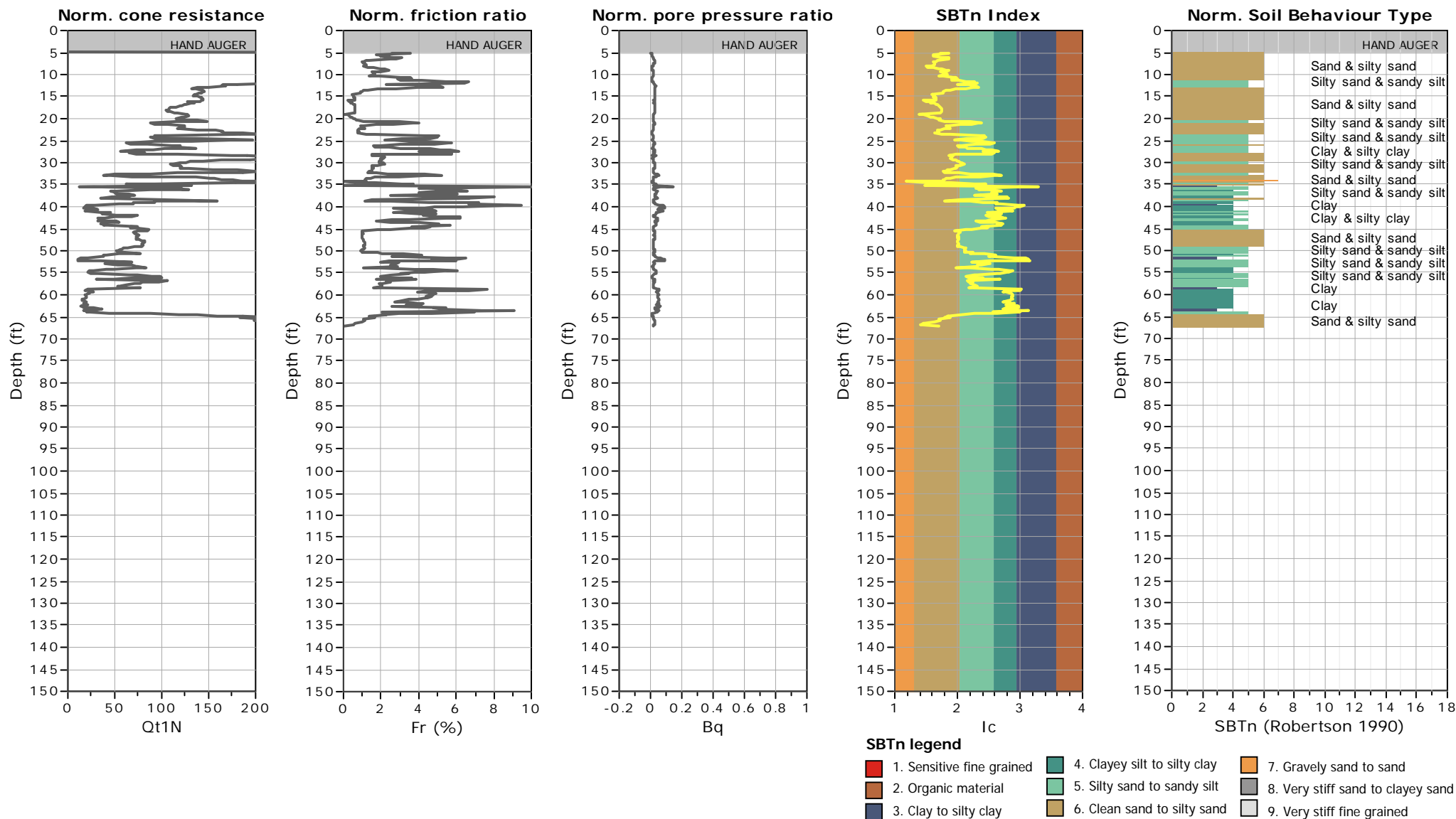
SBT - Bq plots (normalized)



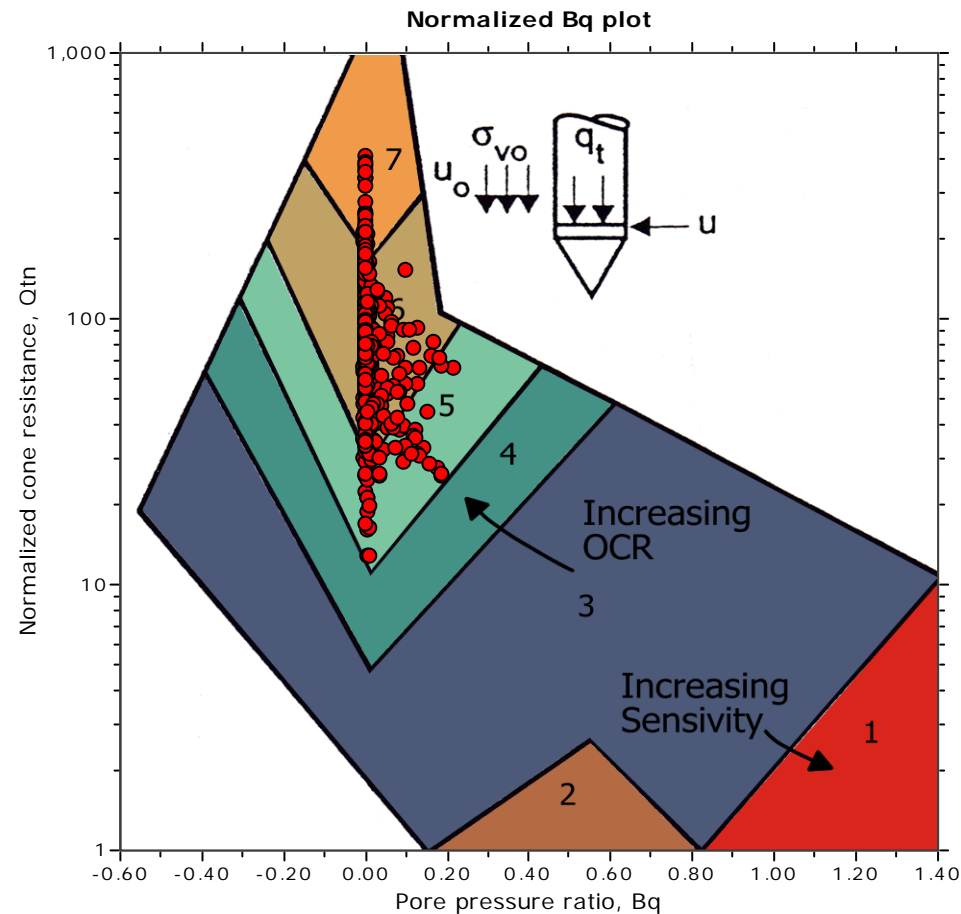
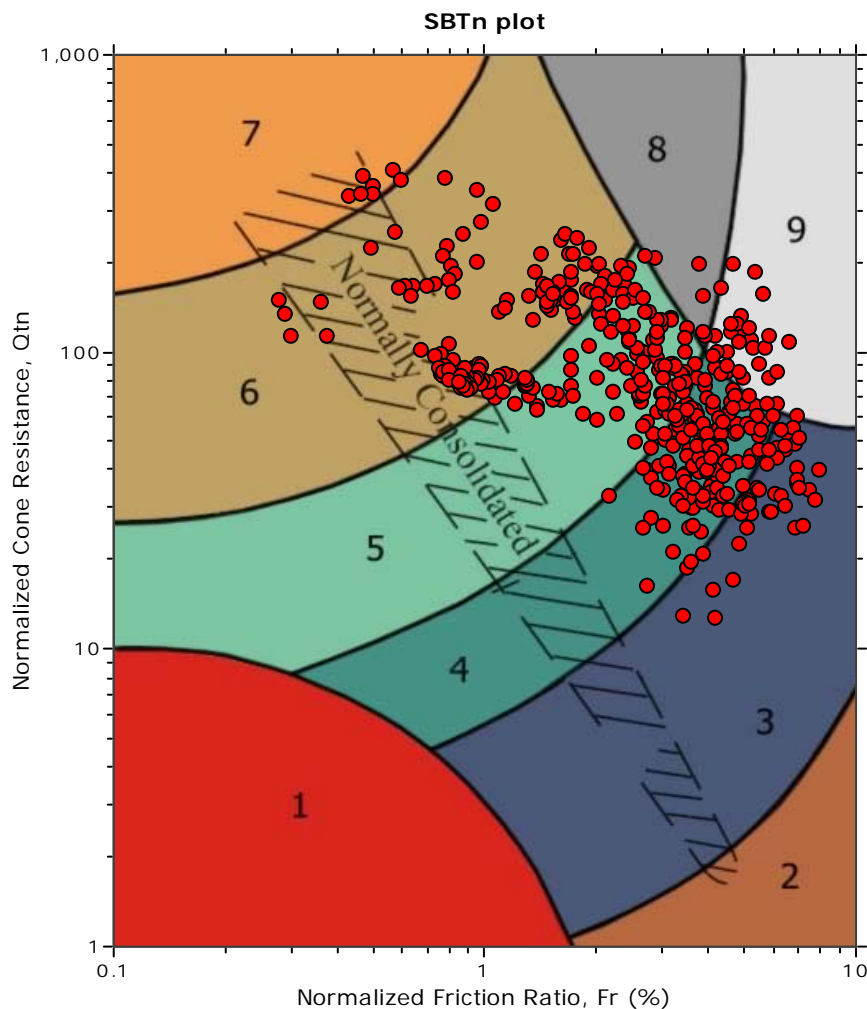
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



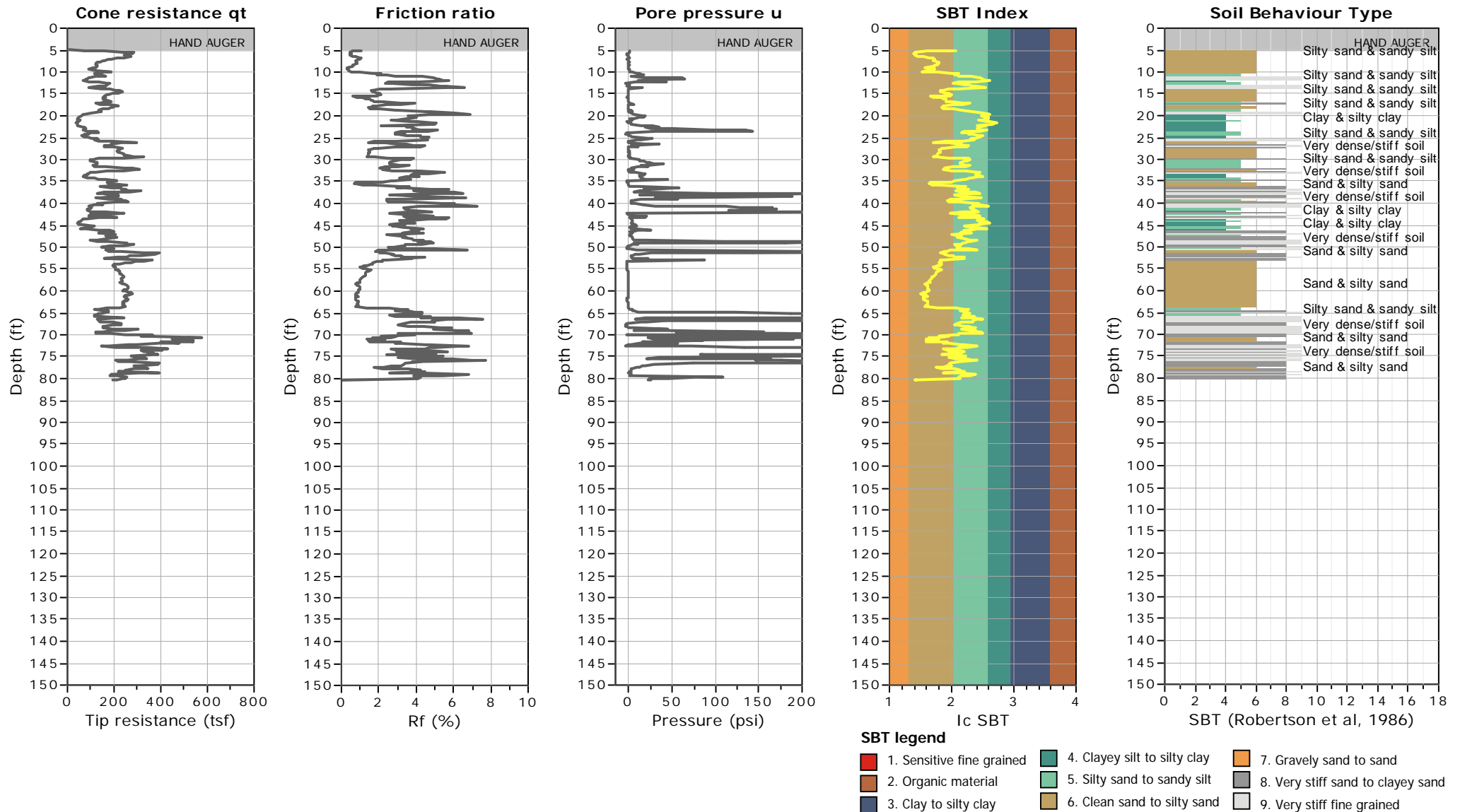


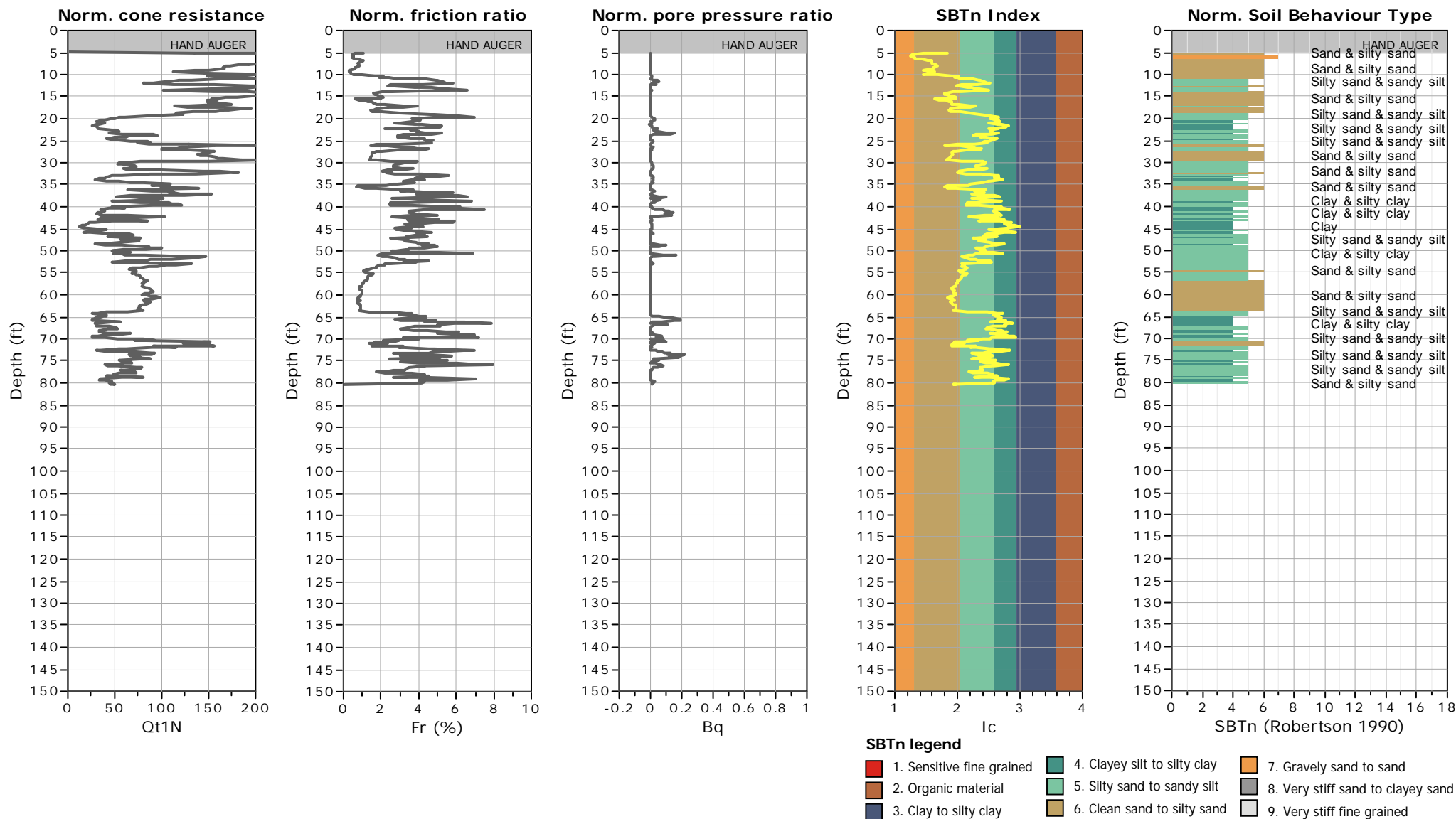
SBT - Bq plots (normalized)



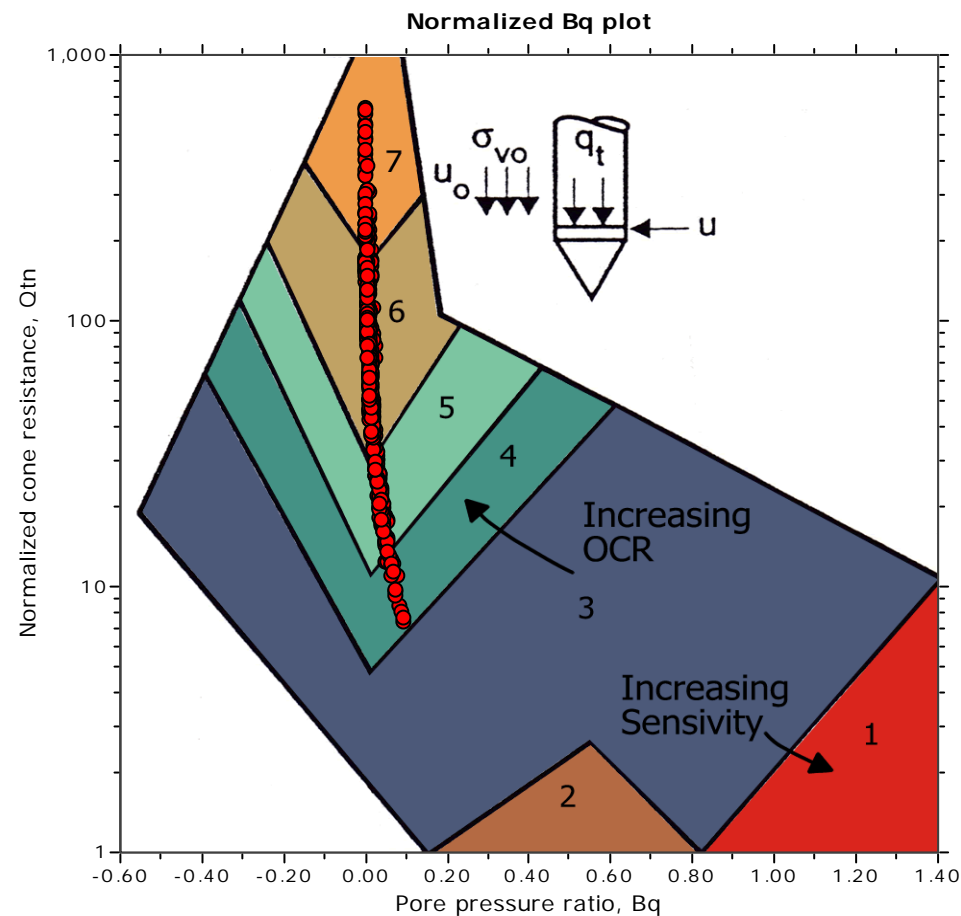
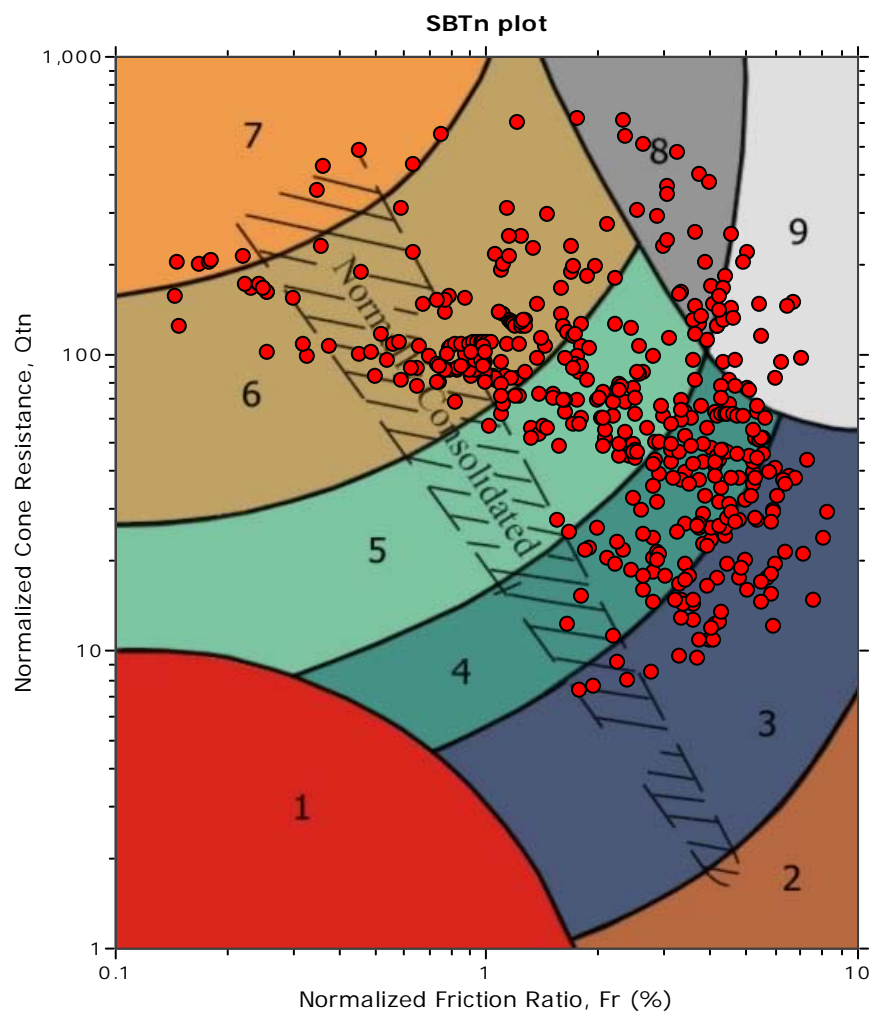
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



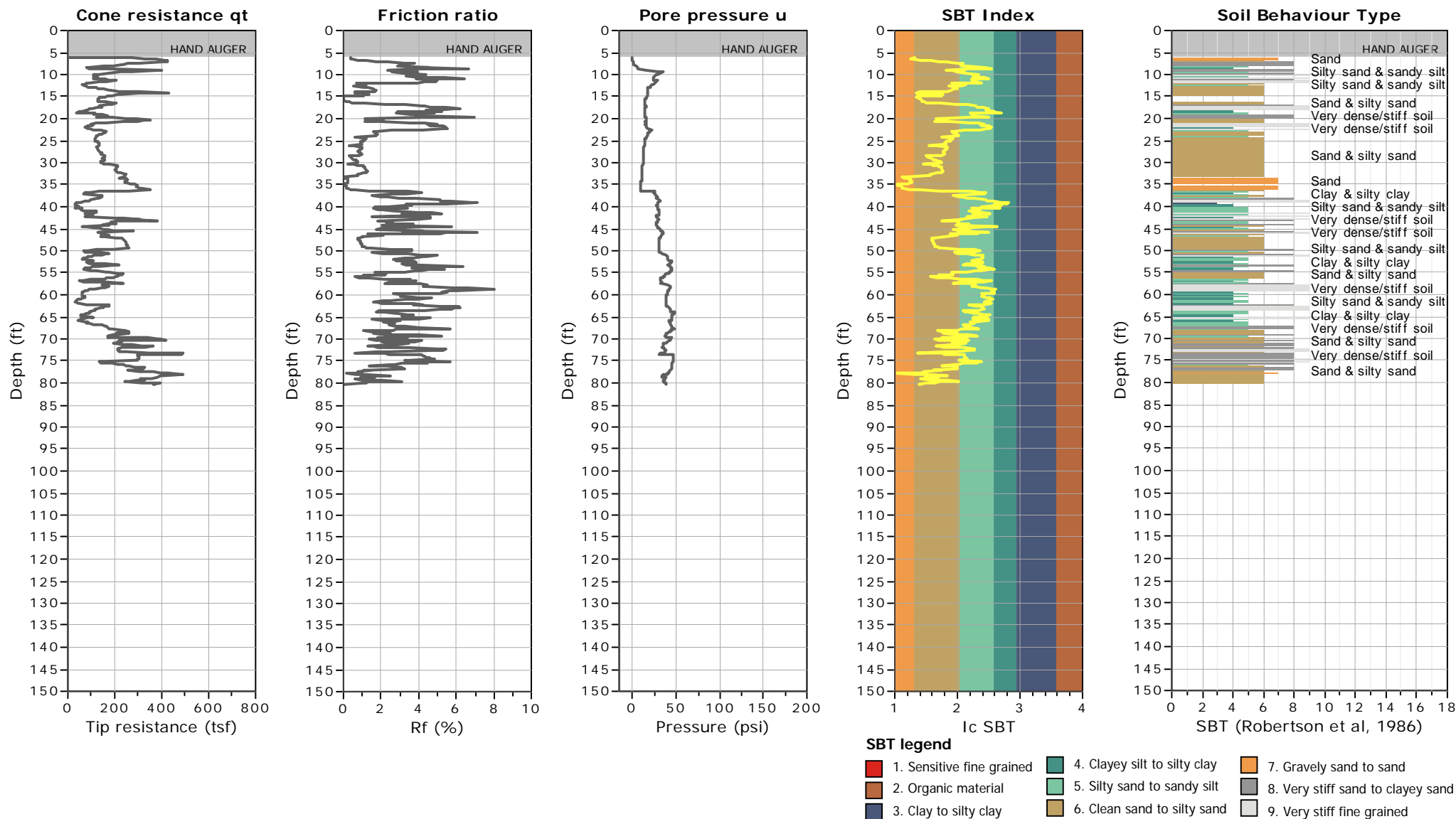


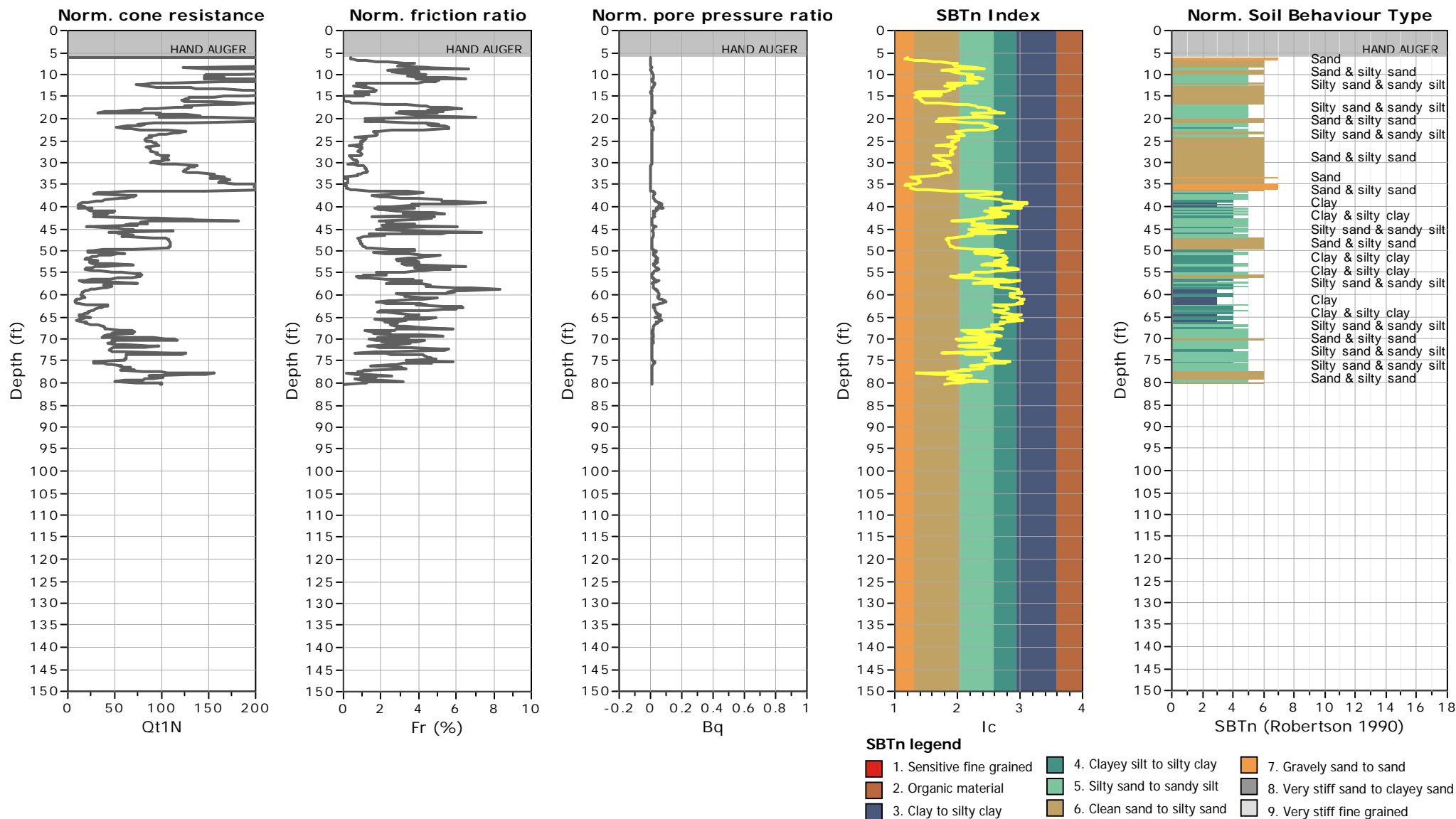
SBT - Bq plots (normalized)



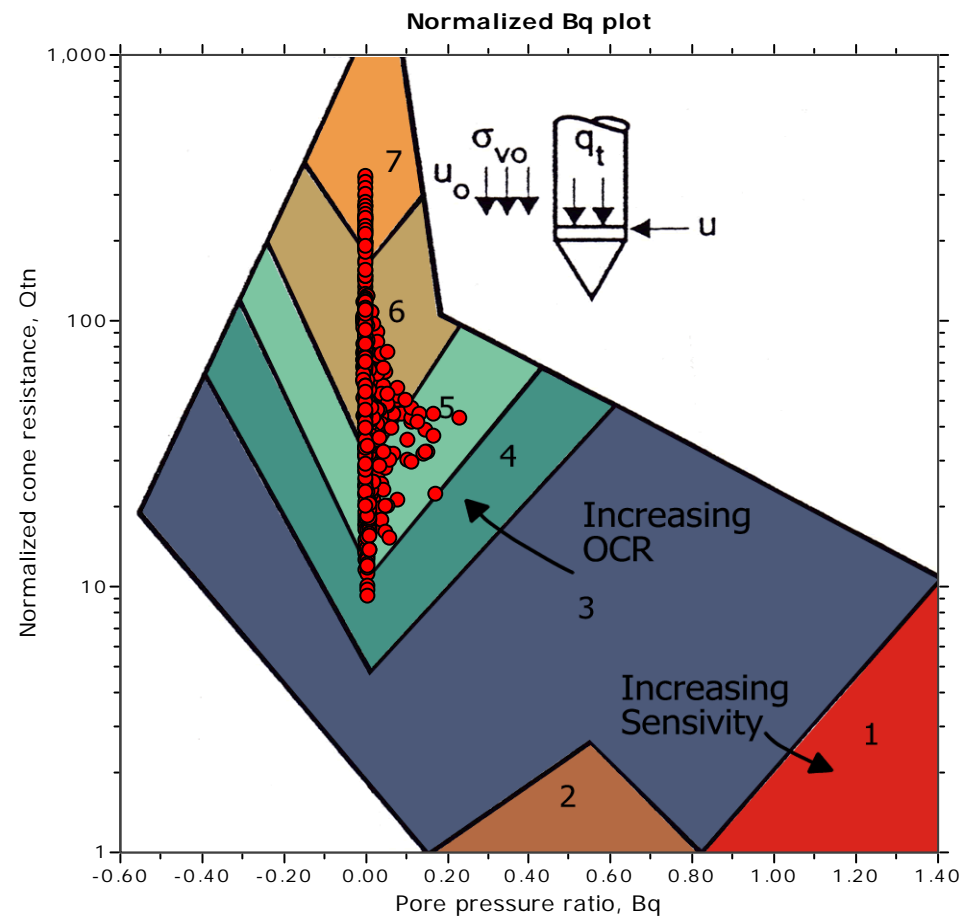
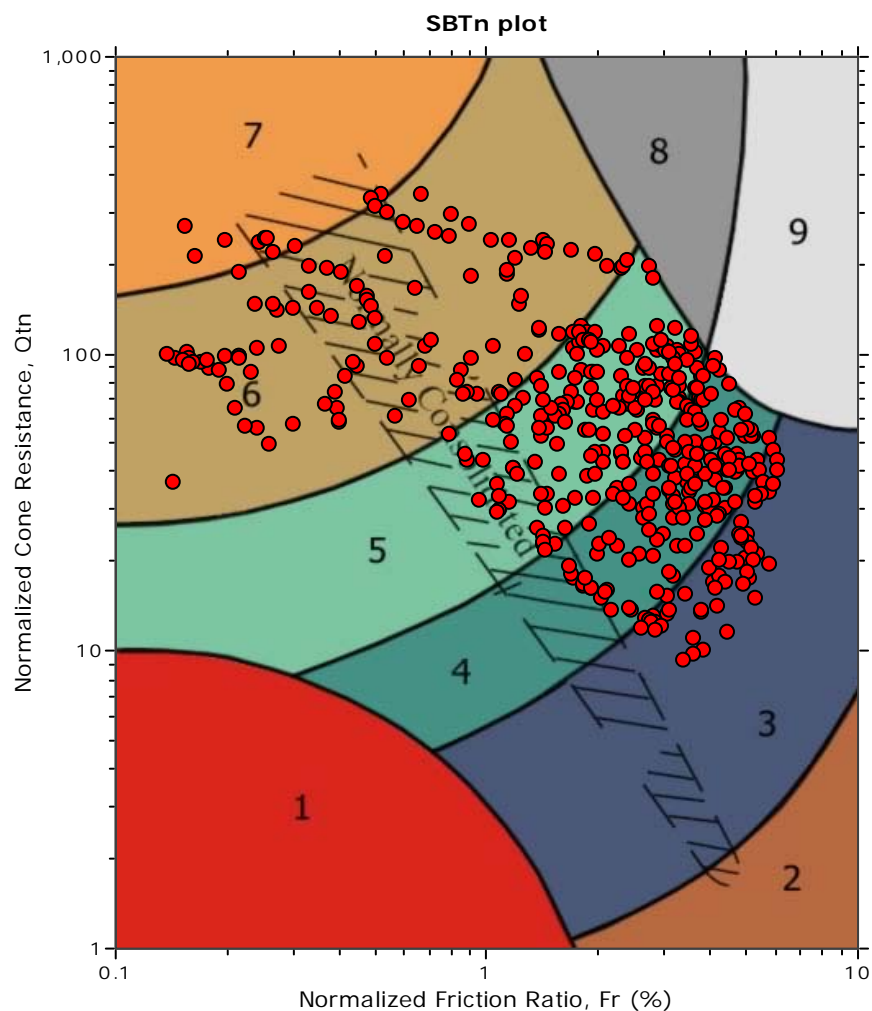
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



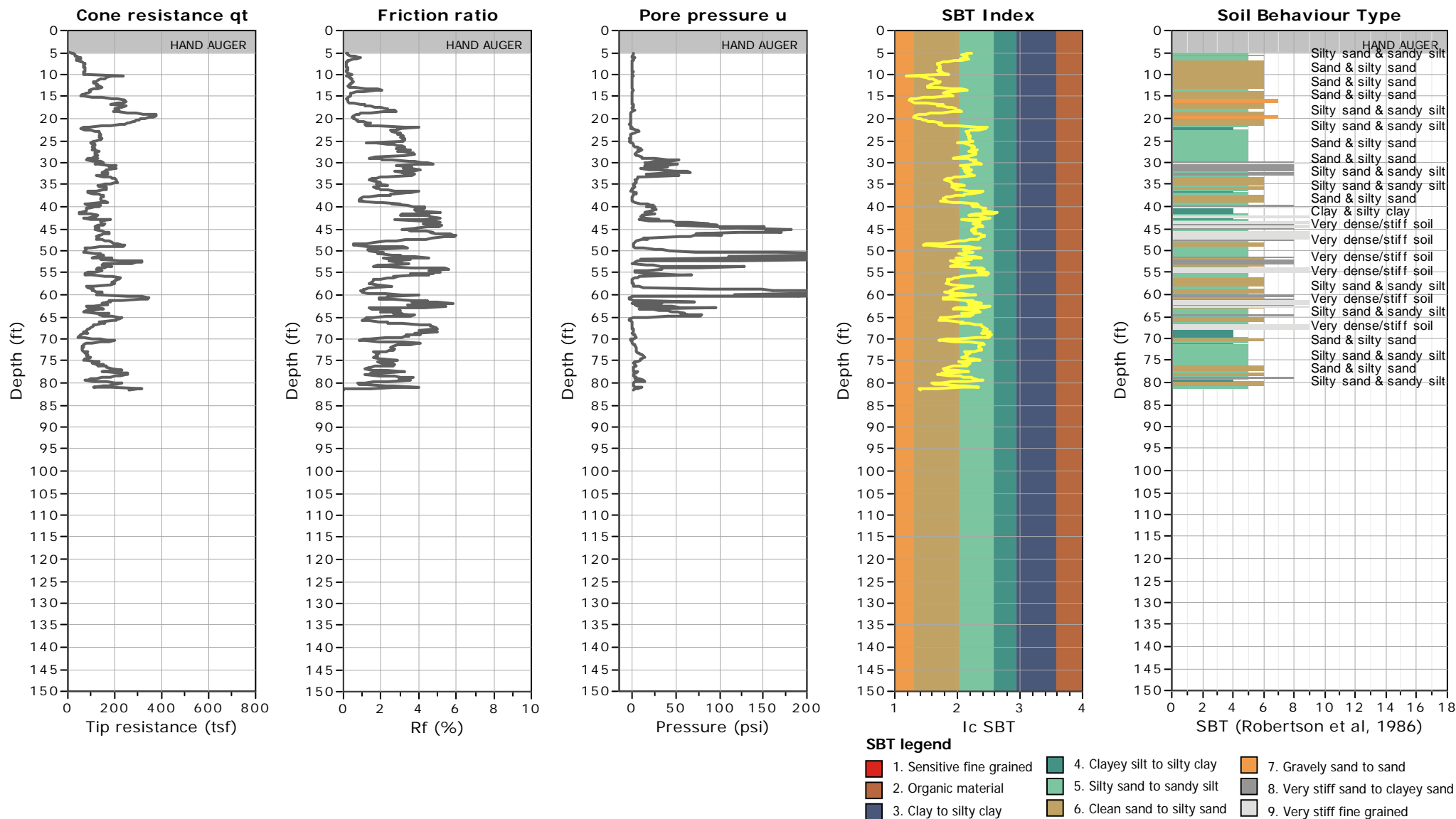


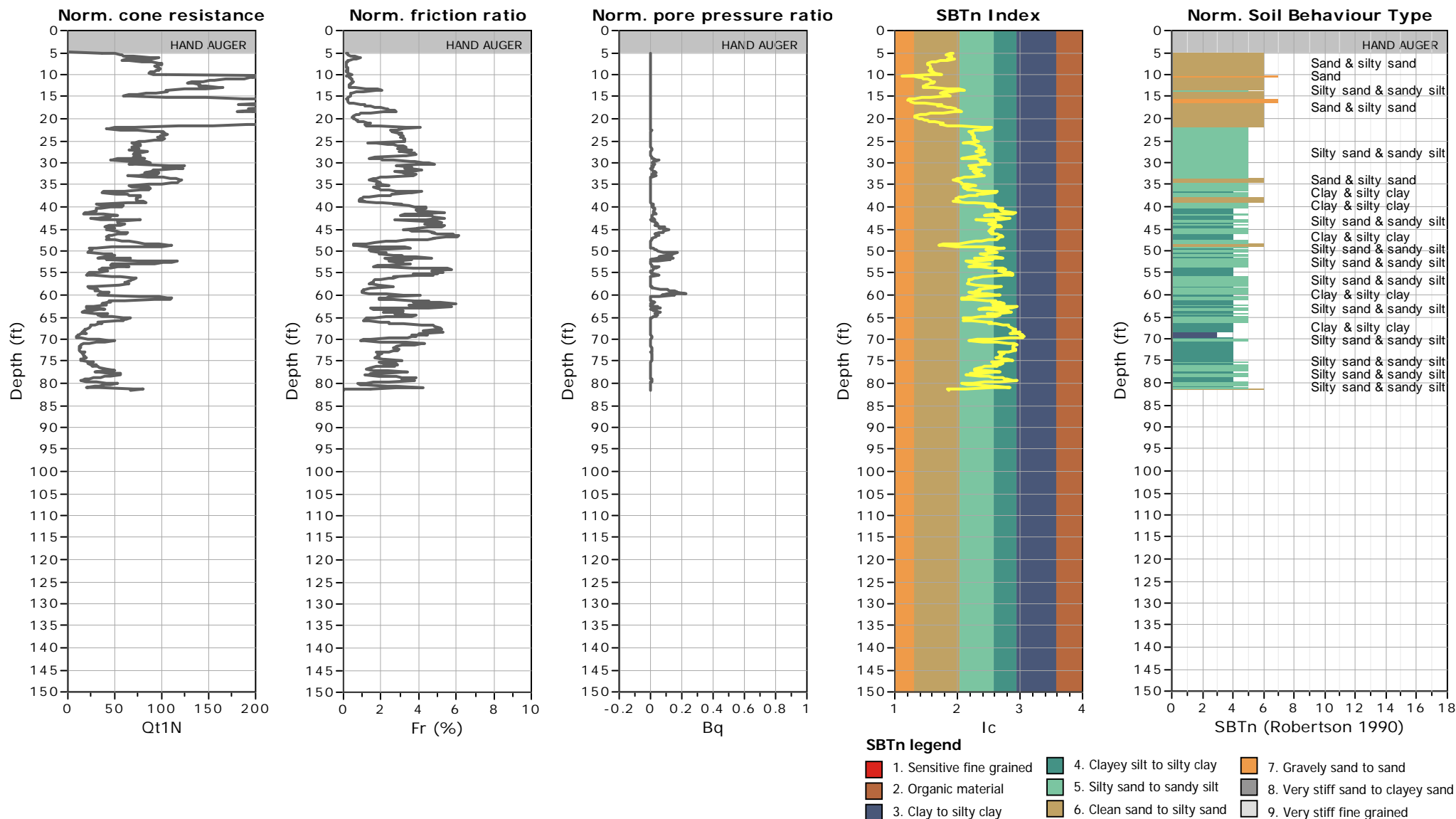
SBT - Bq plots (normalized)



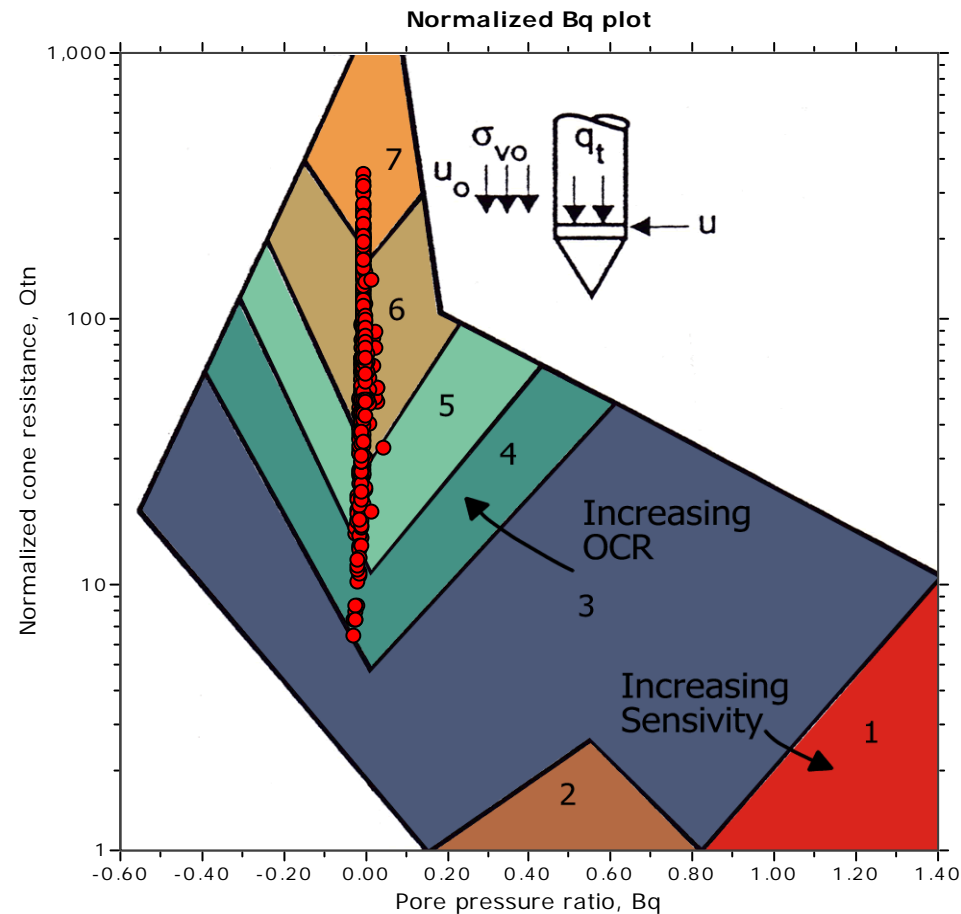
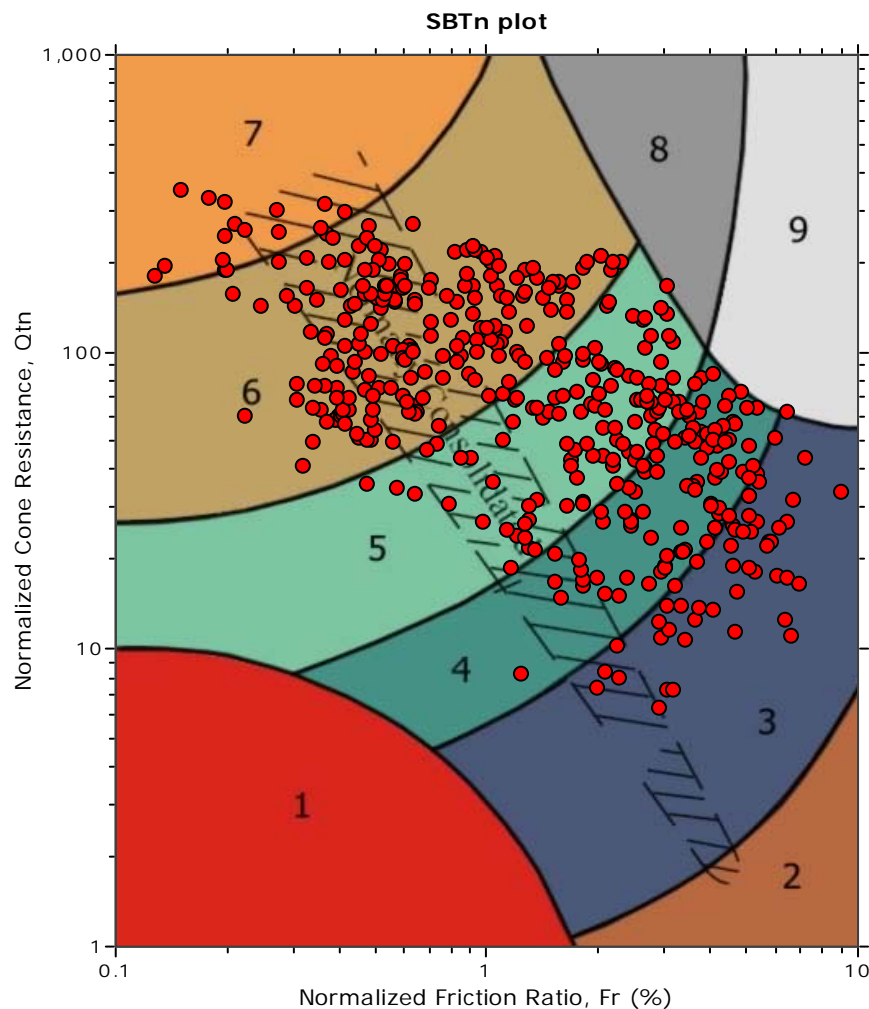
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



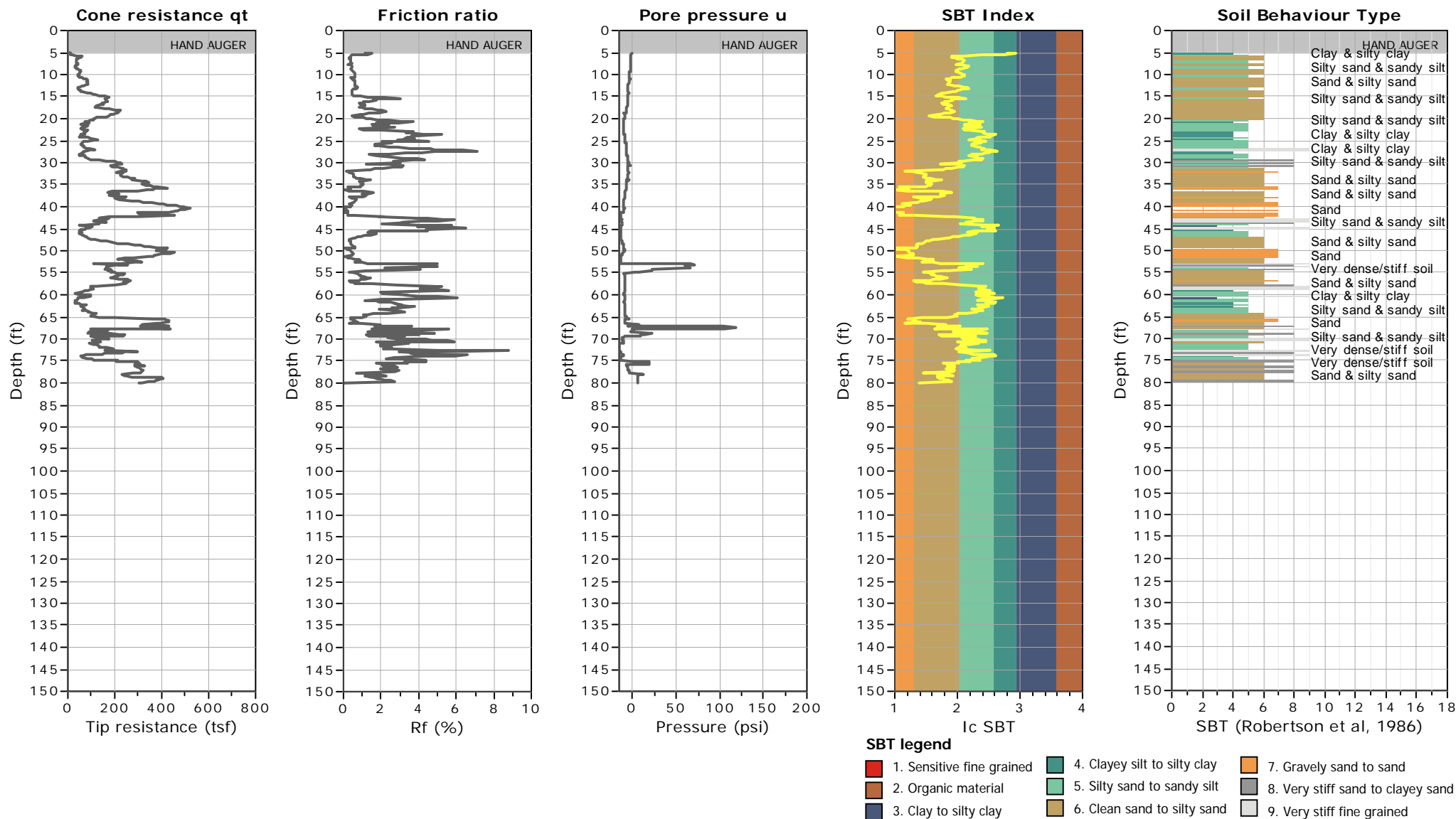


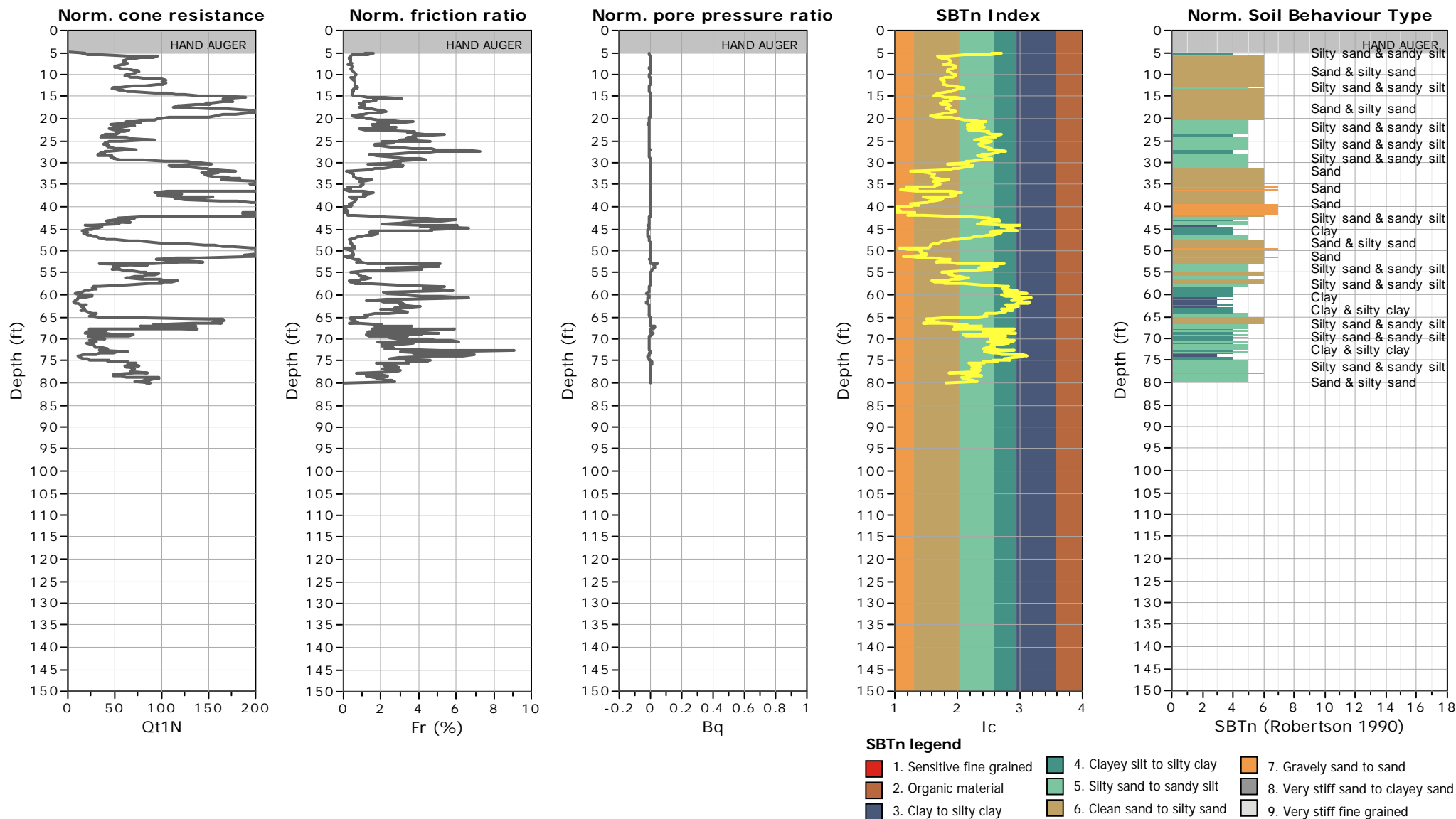
SBT - Bq plots (normalized)



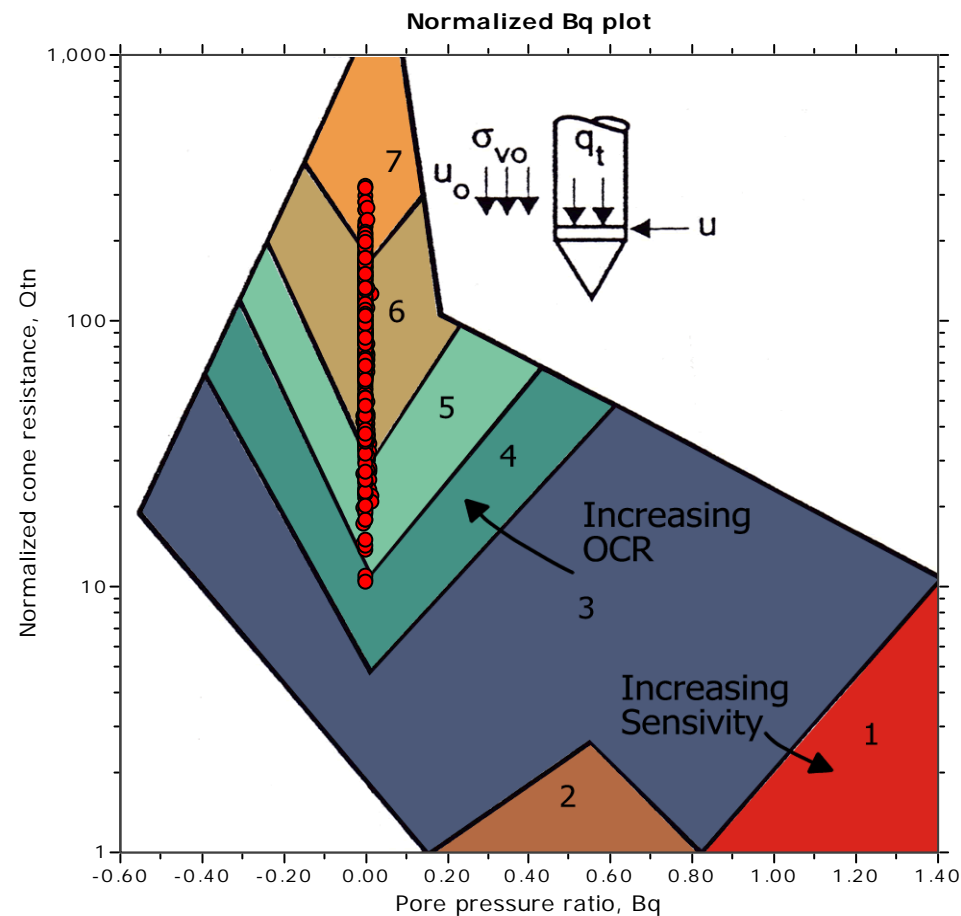
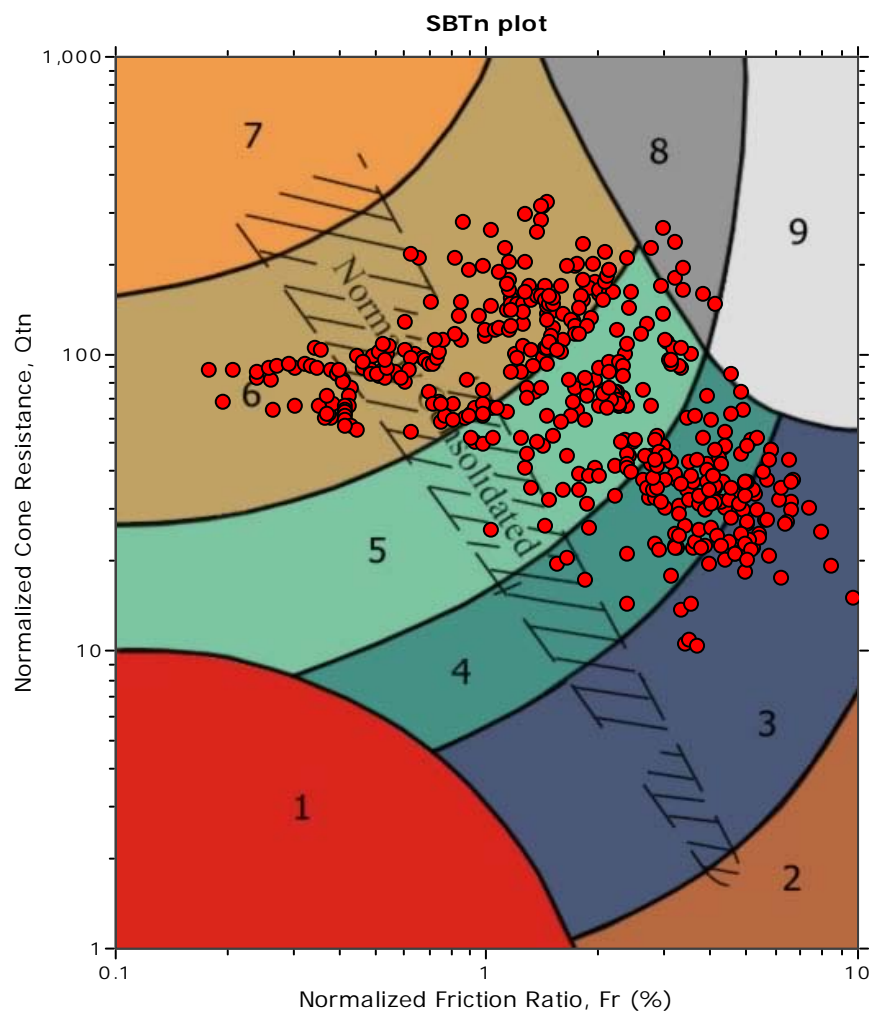
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



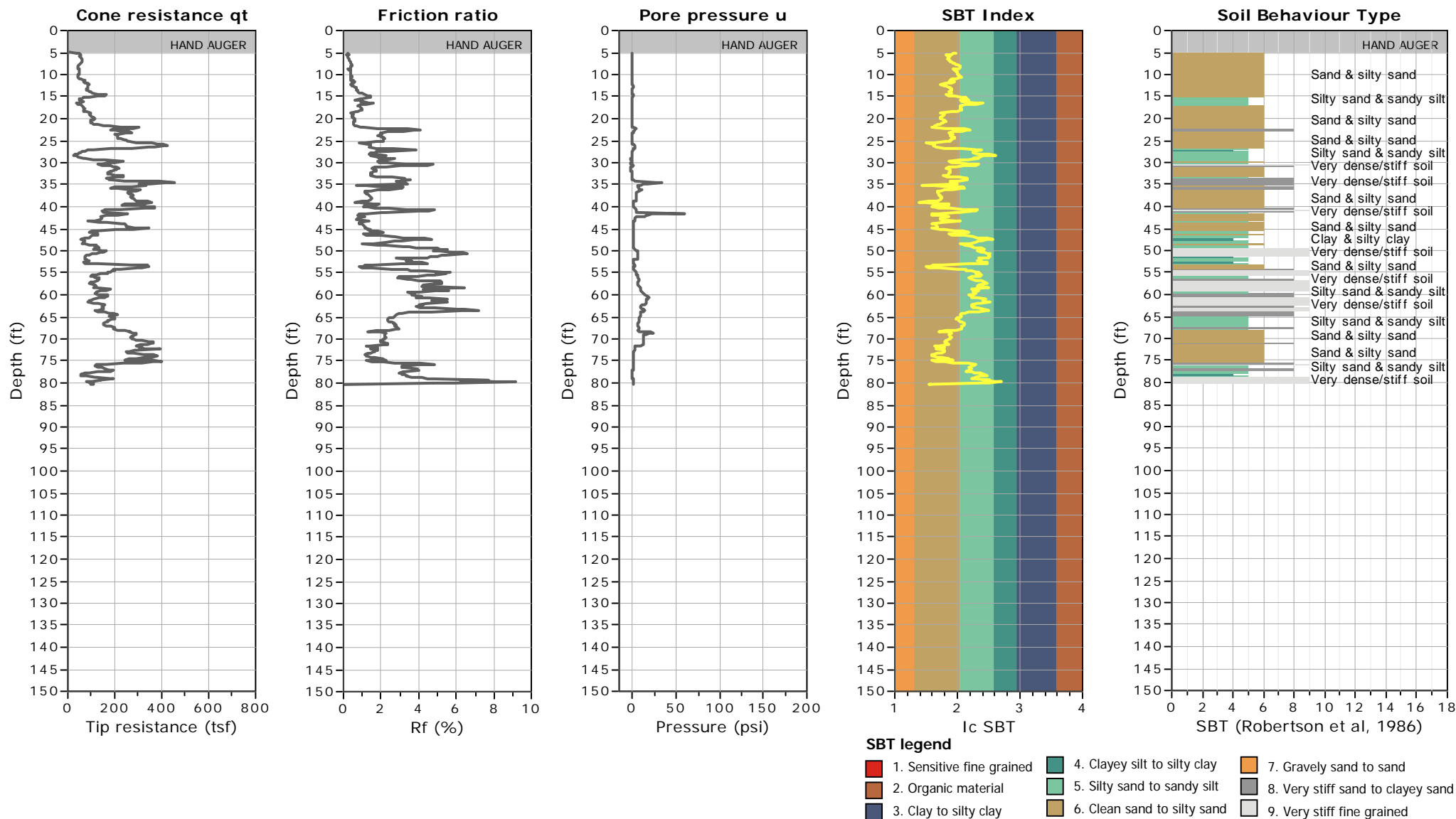


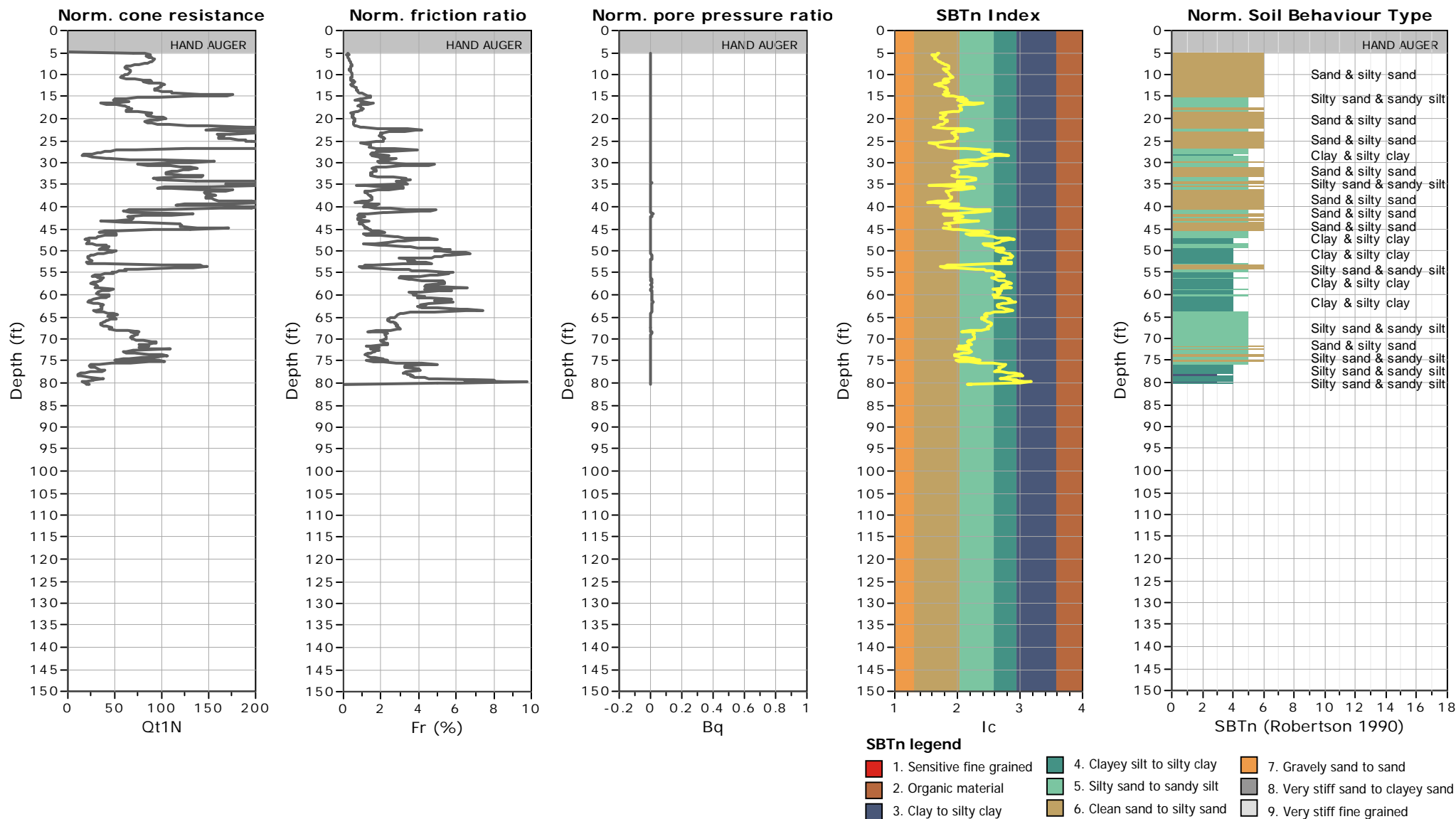
SBT - Bq plots (normalized)



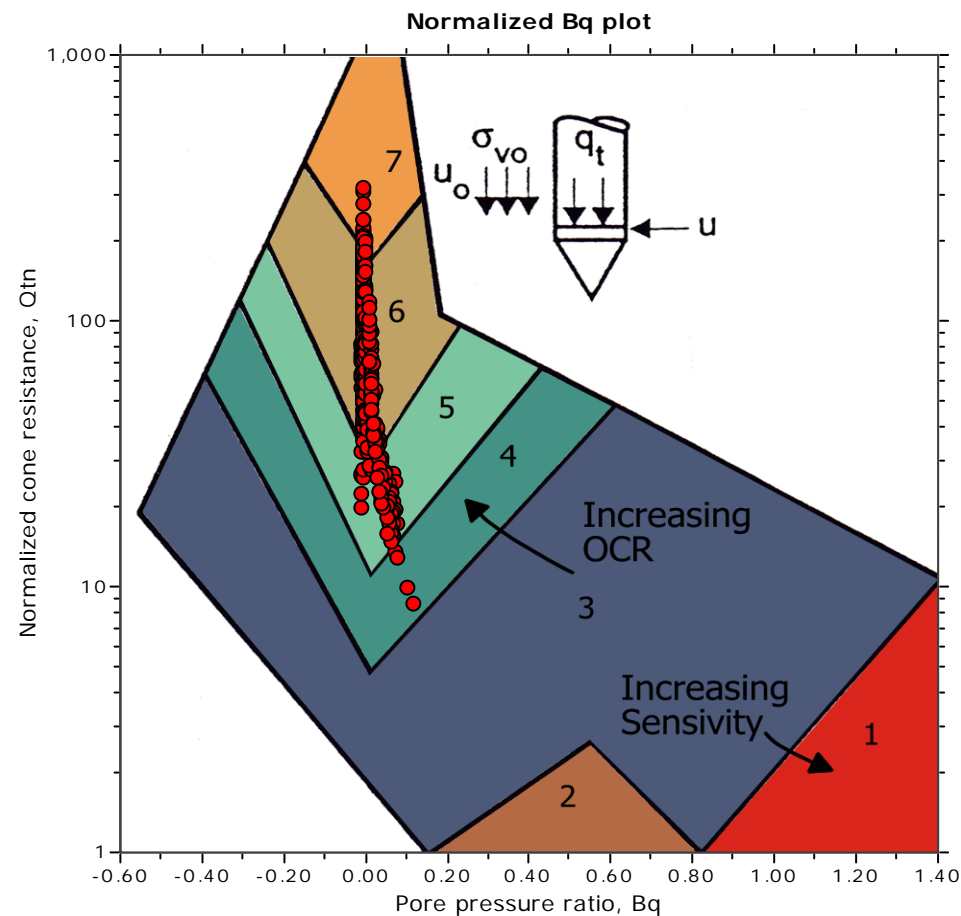
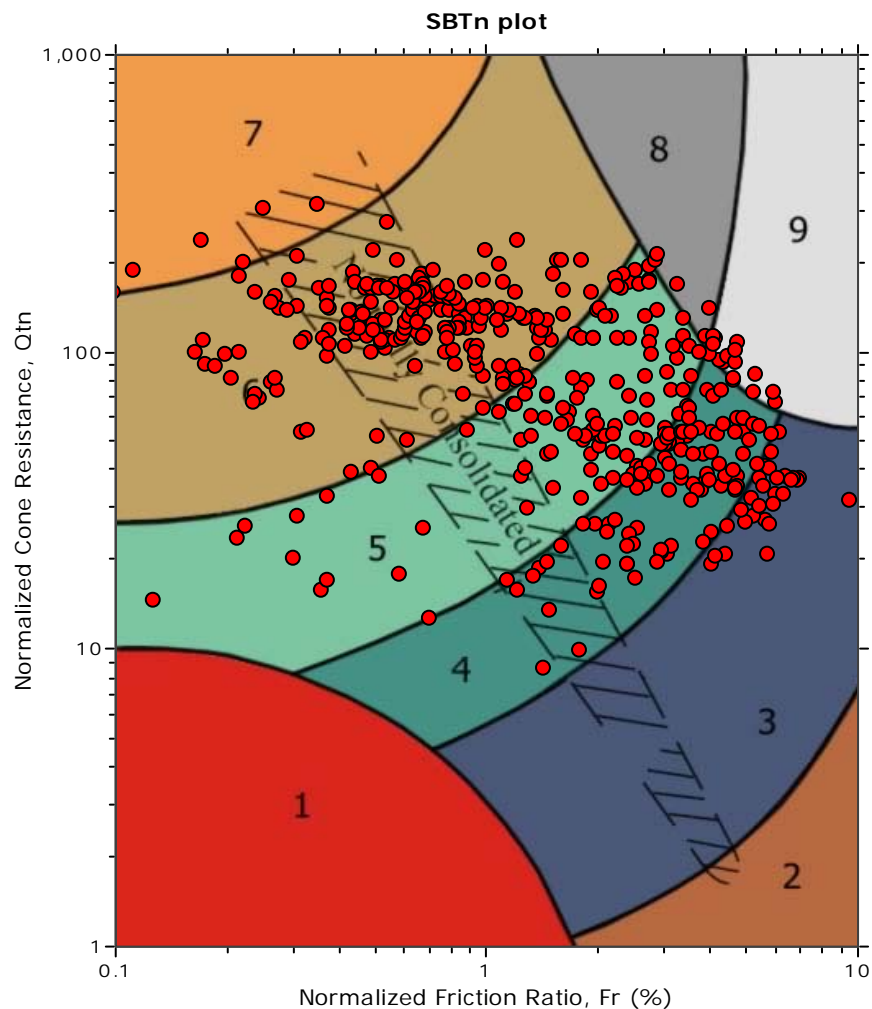
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



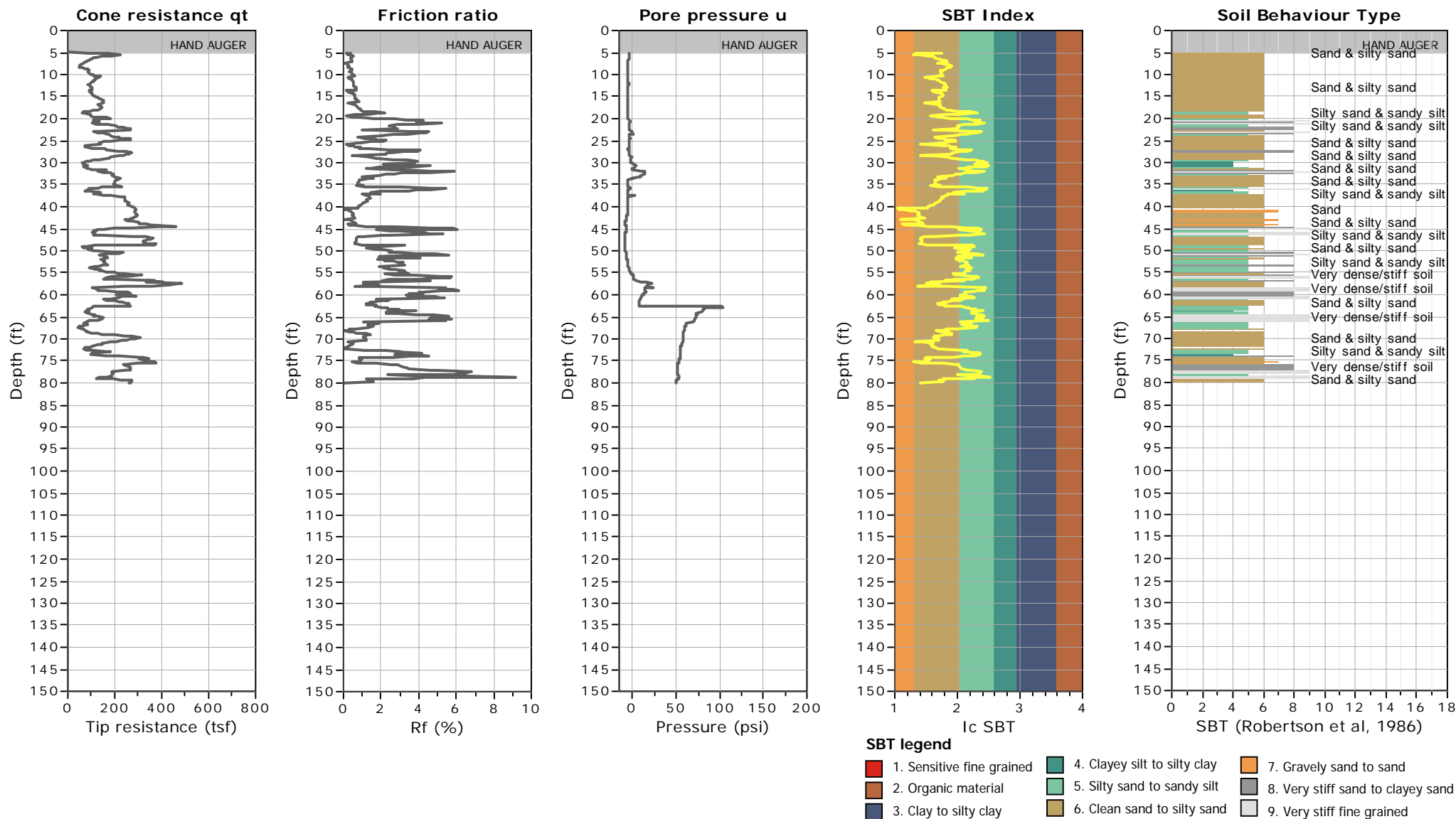


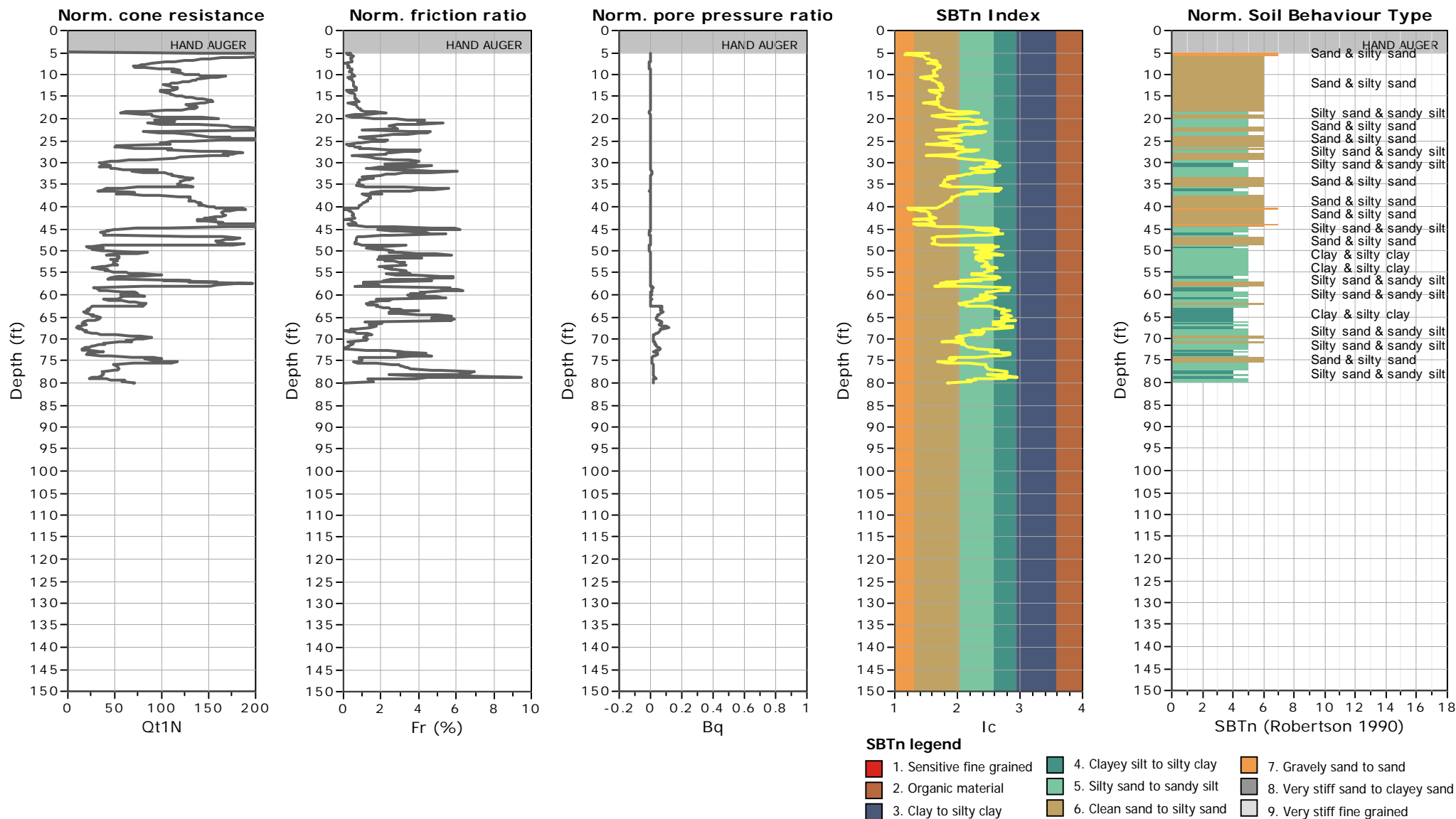
SBT - Bq plots (normalized)



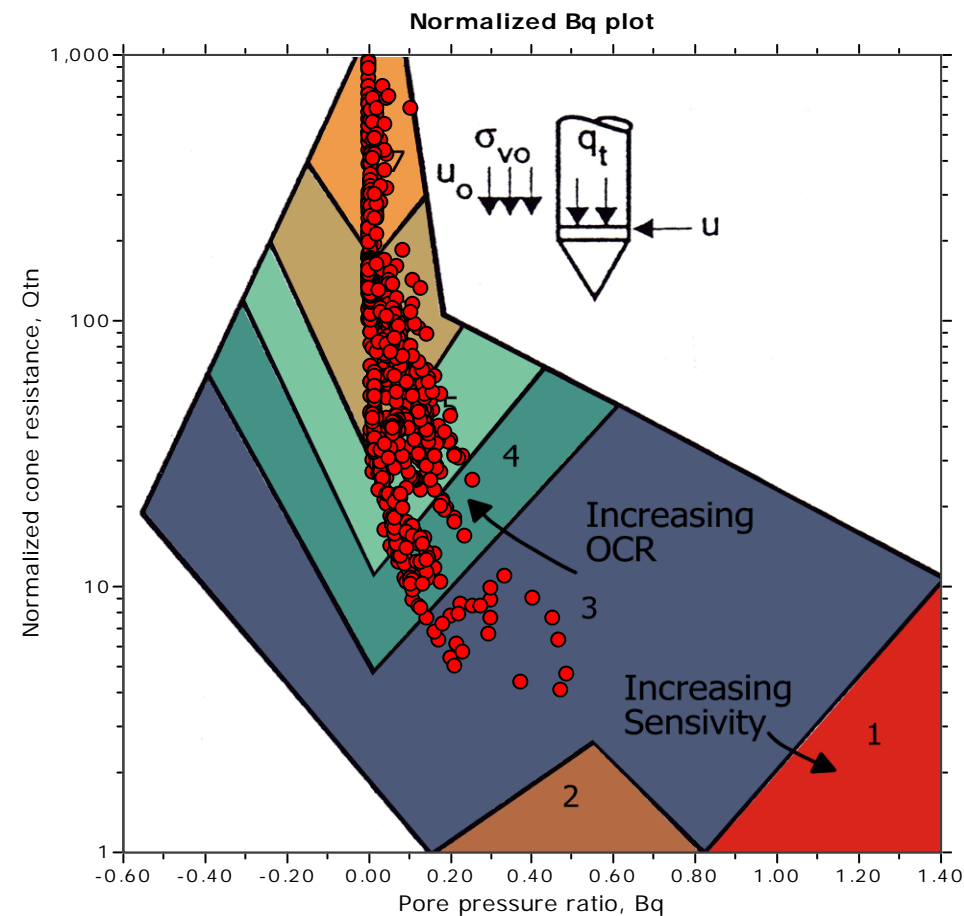
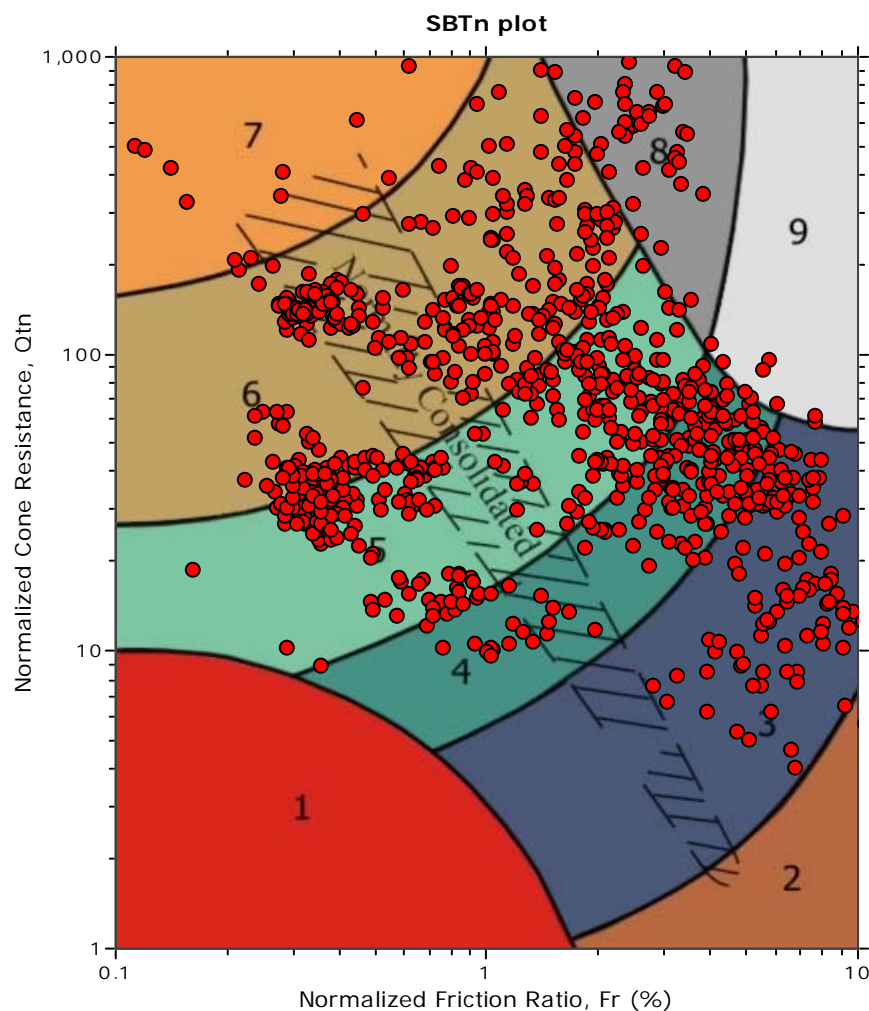
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



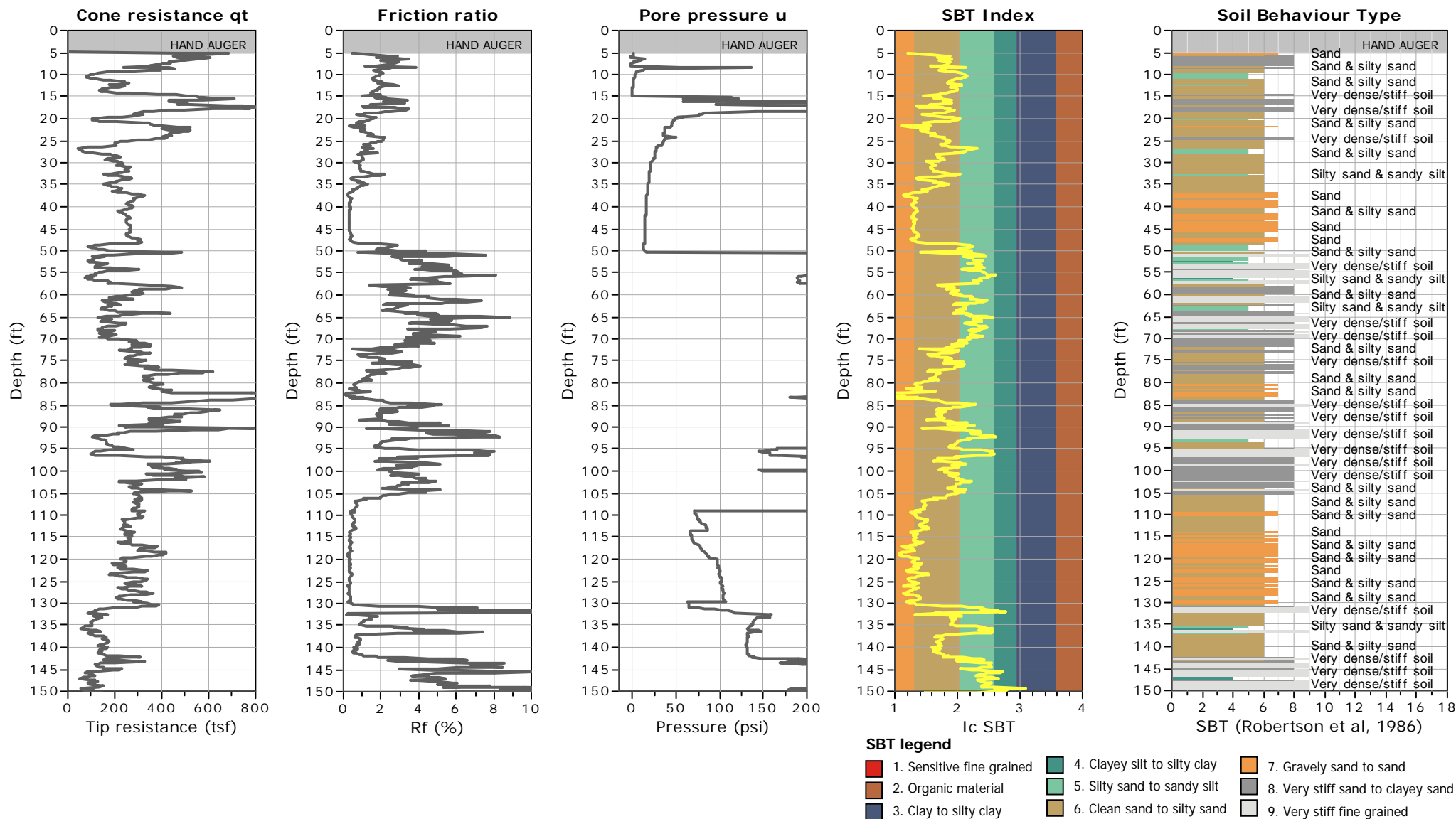


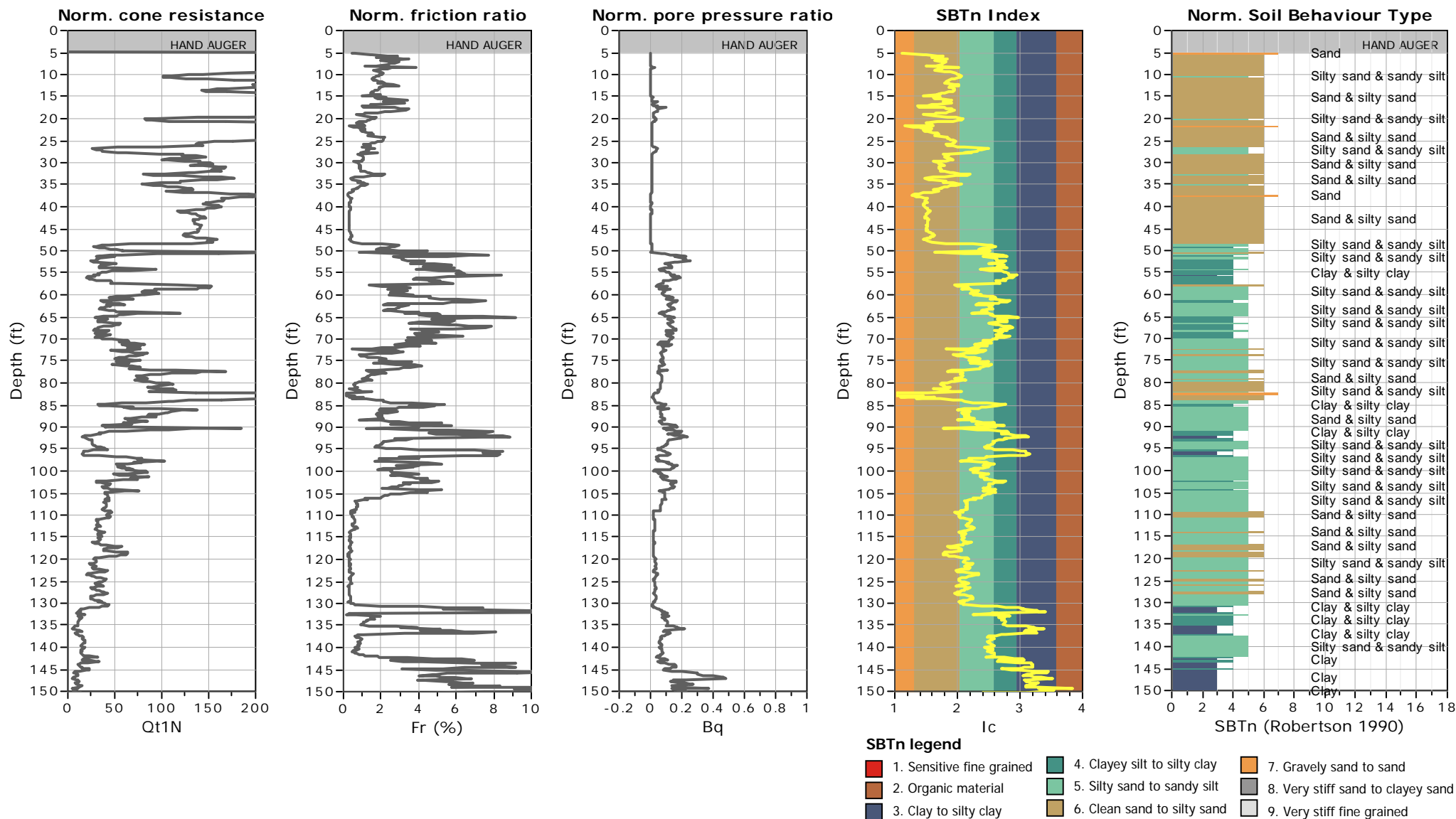
SBT - Bq plots (normalized)



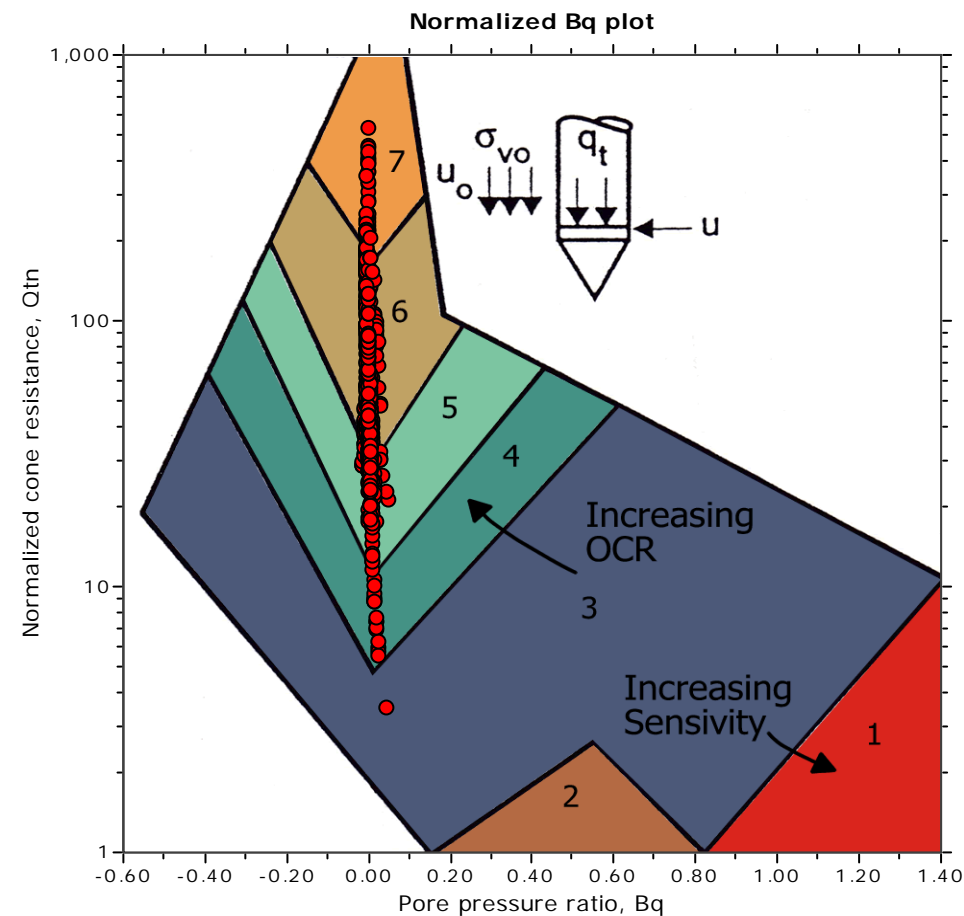
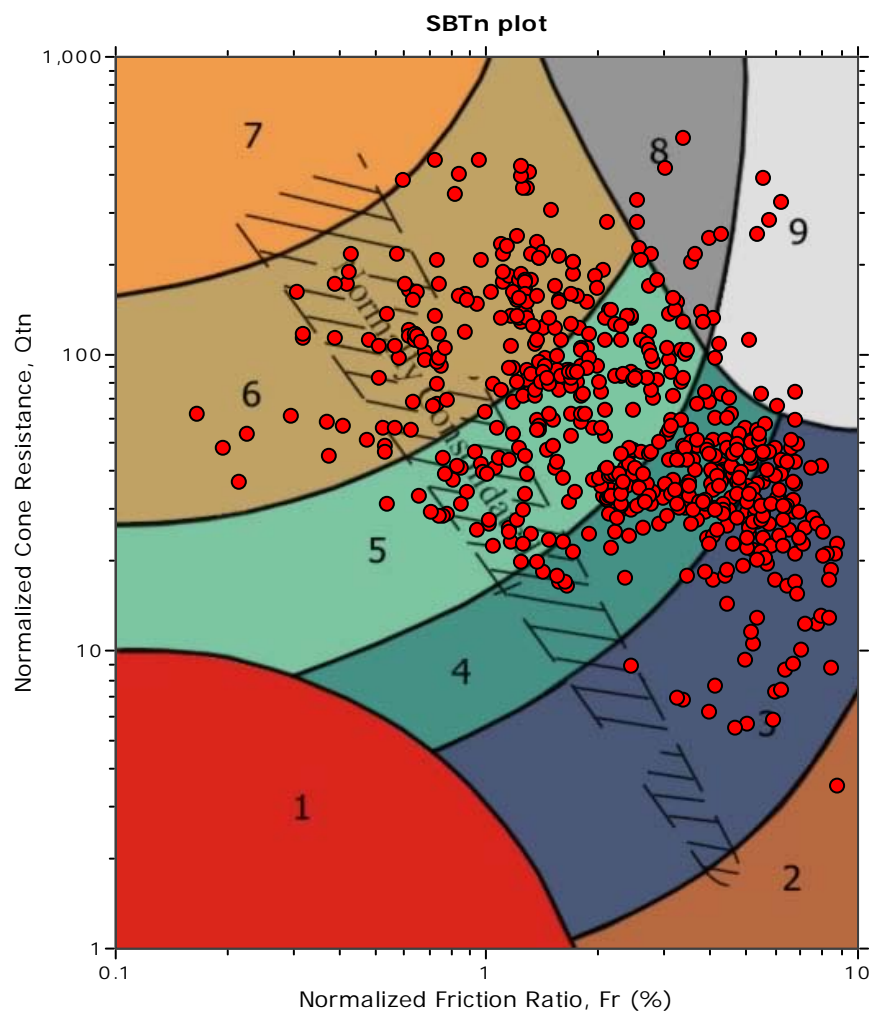
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



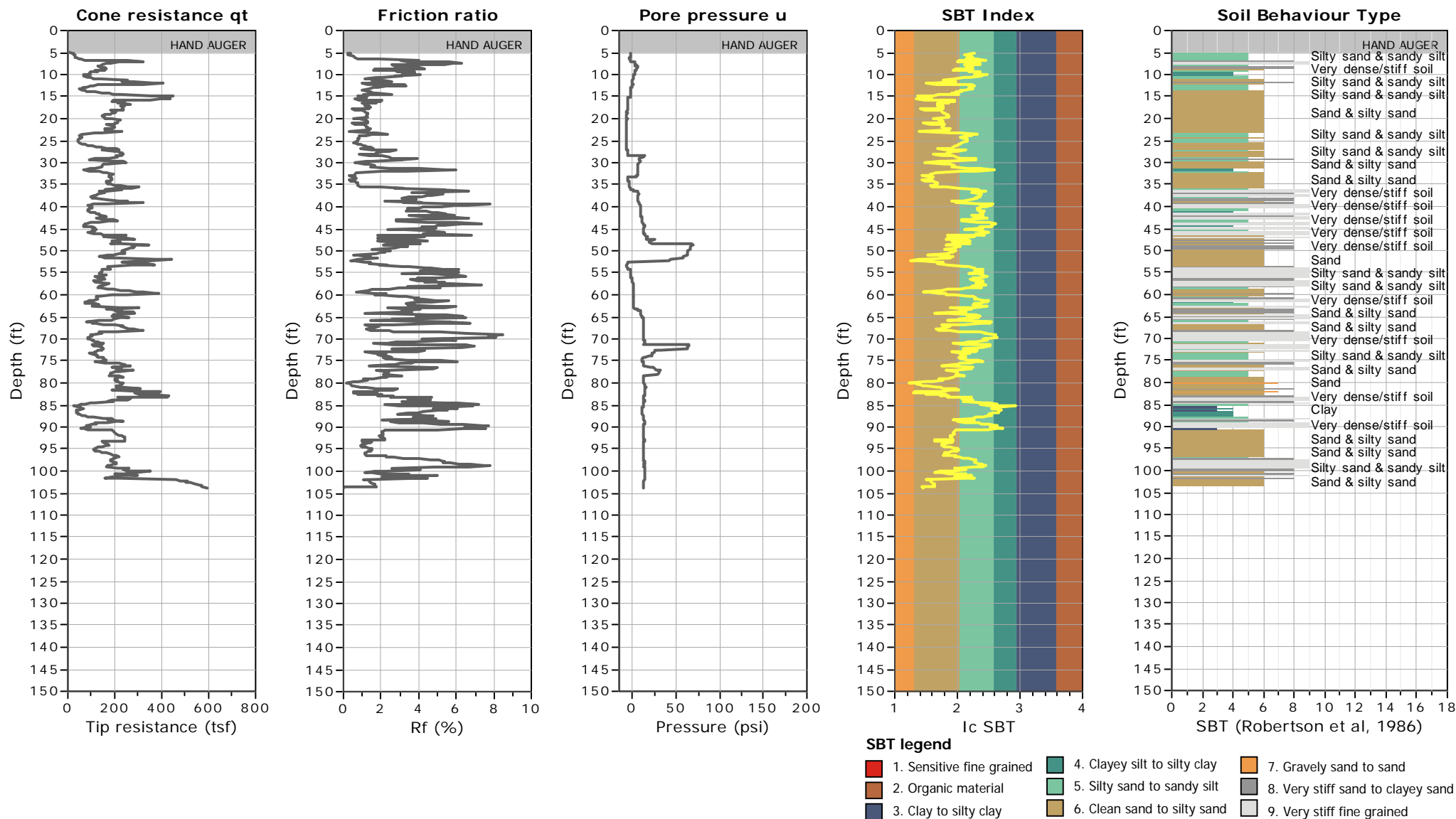


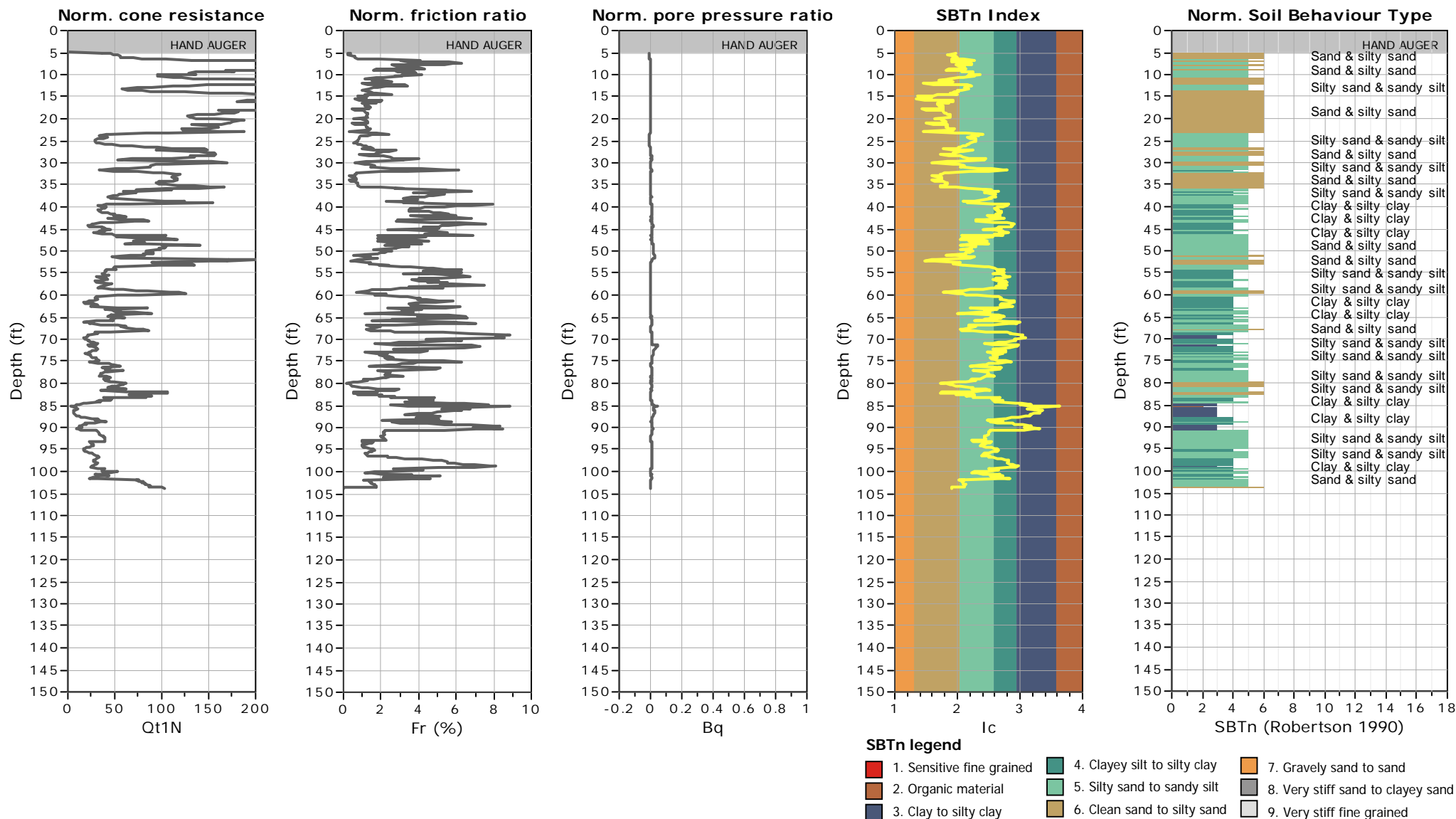
SBT - Bq plots (normalized)



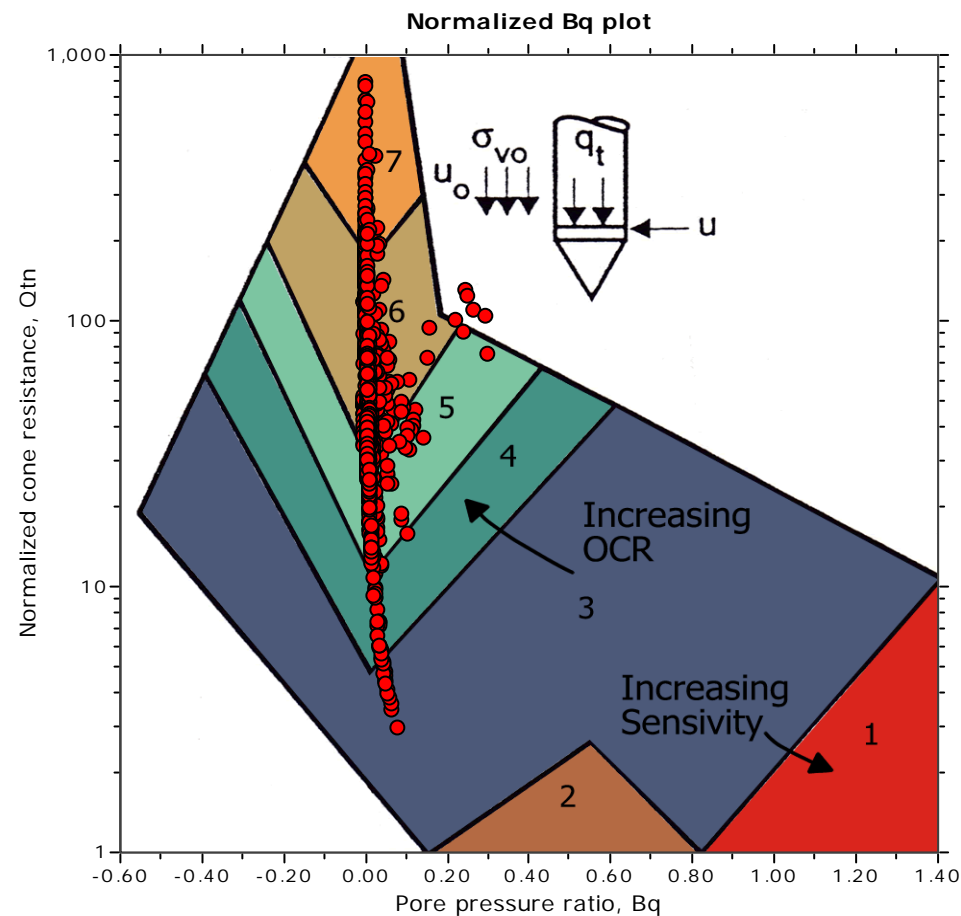
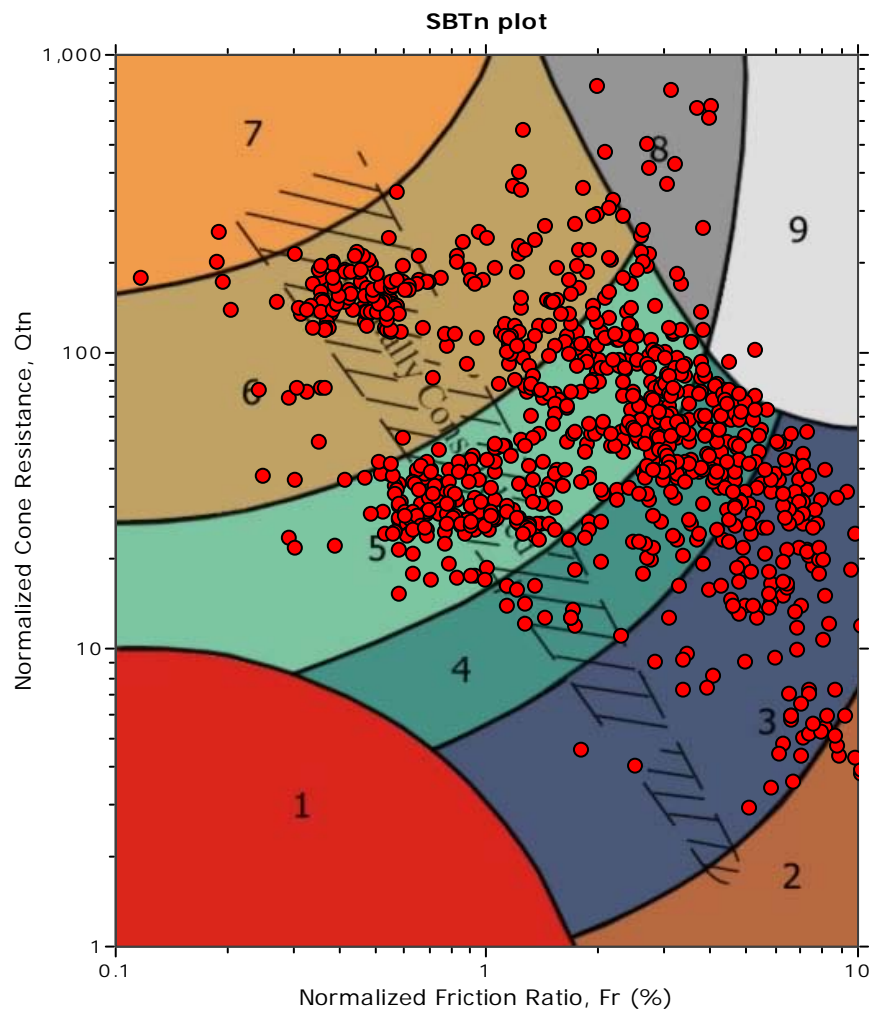
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



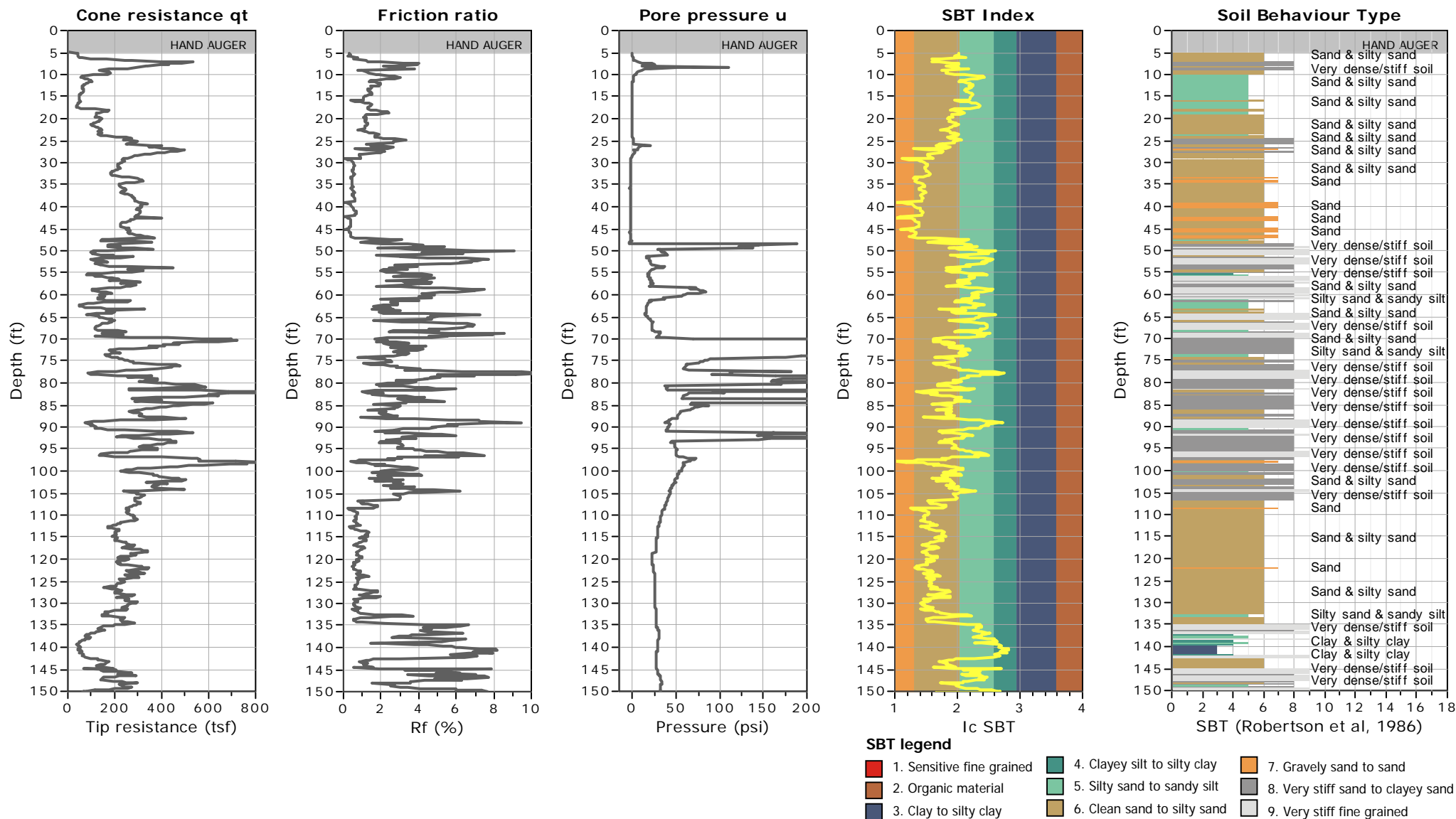


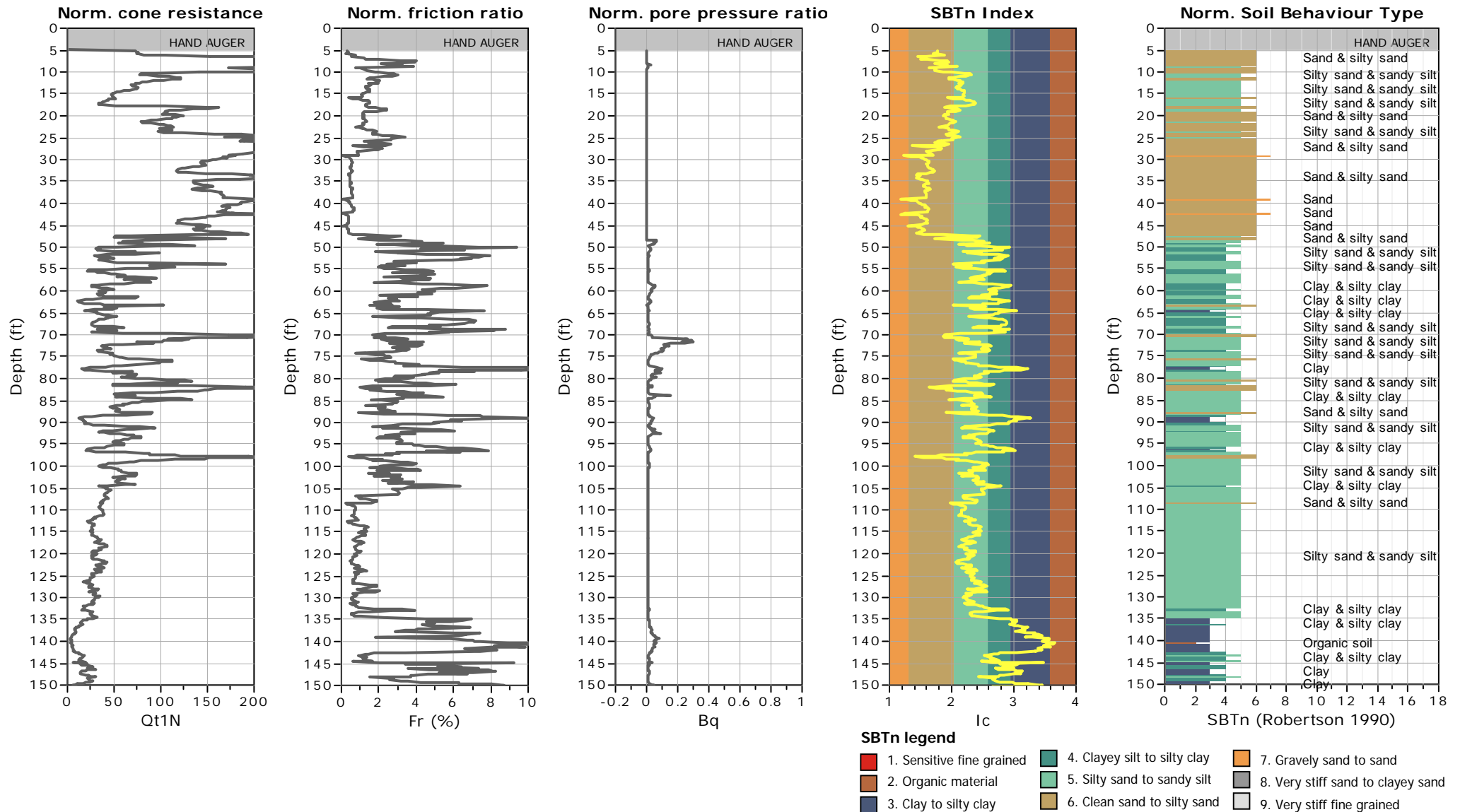
SBT - Bq plots (normalized)



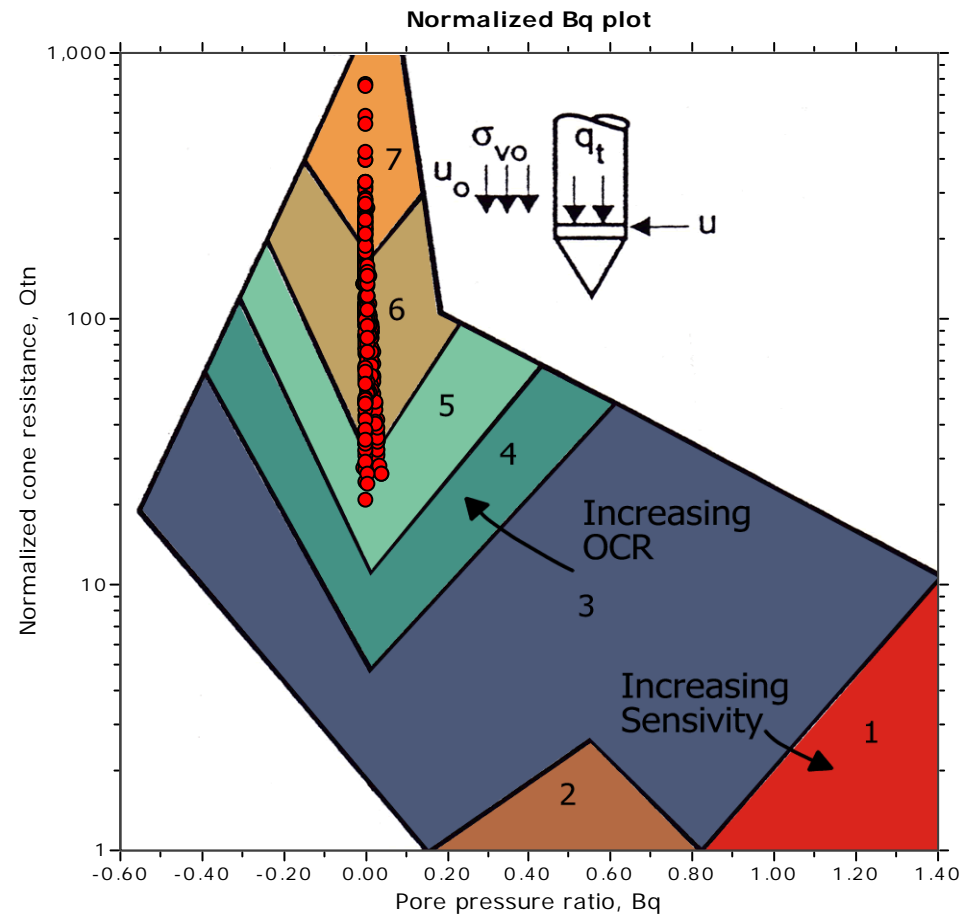
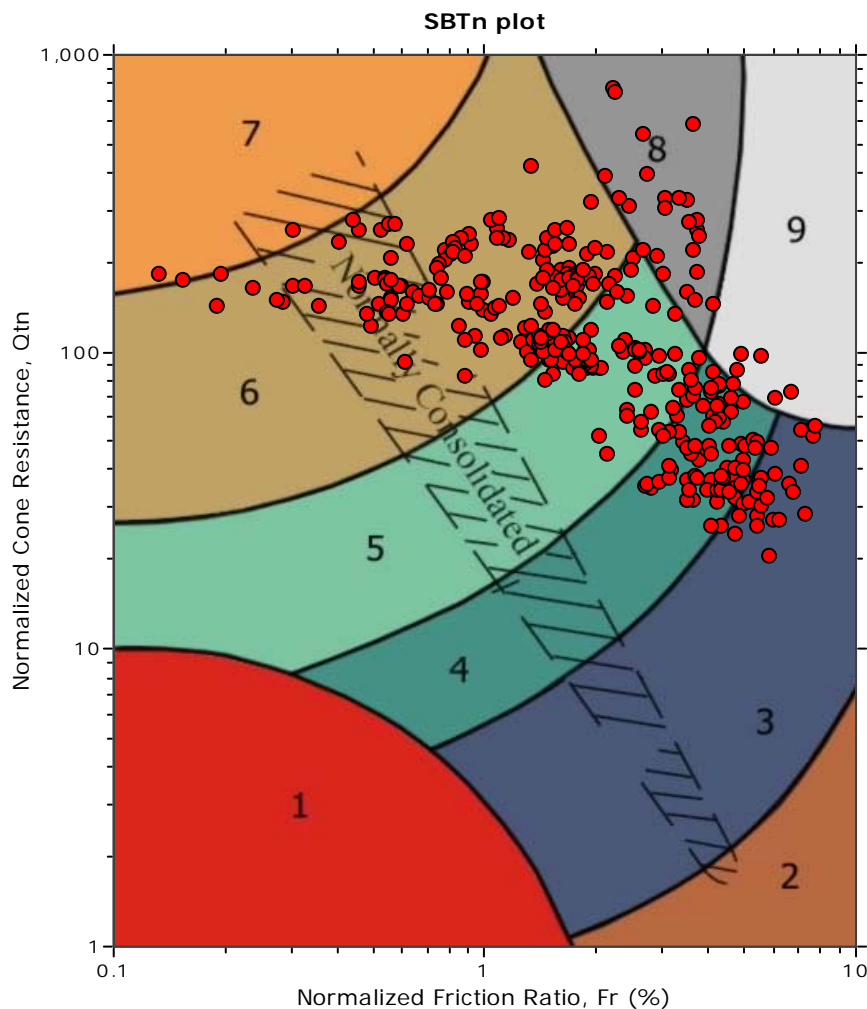
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



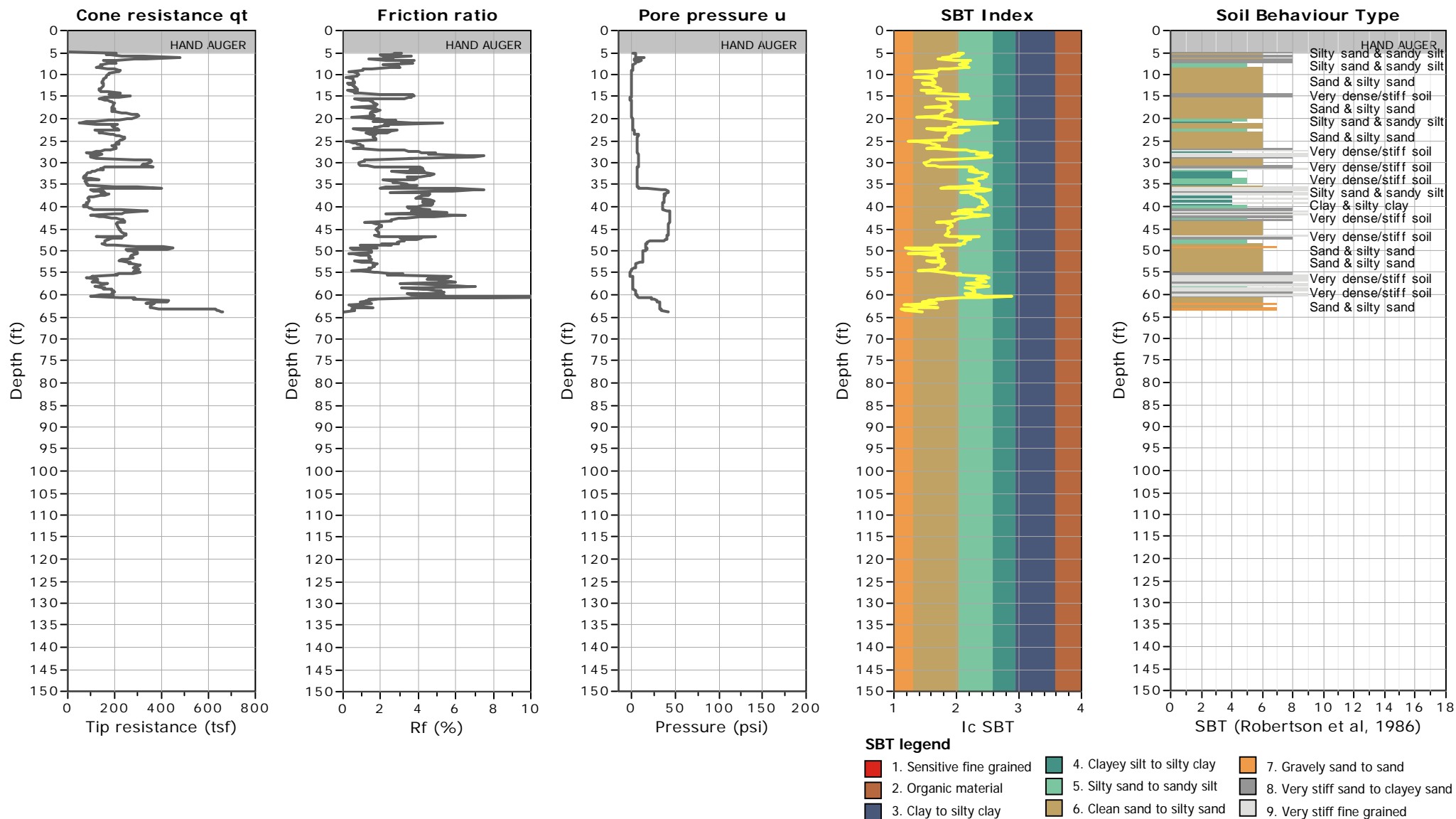


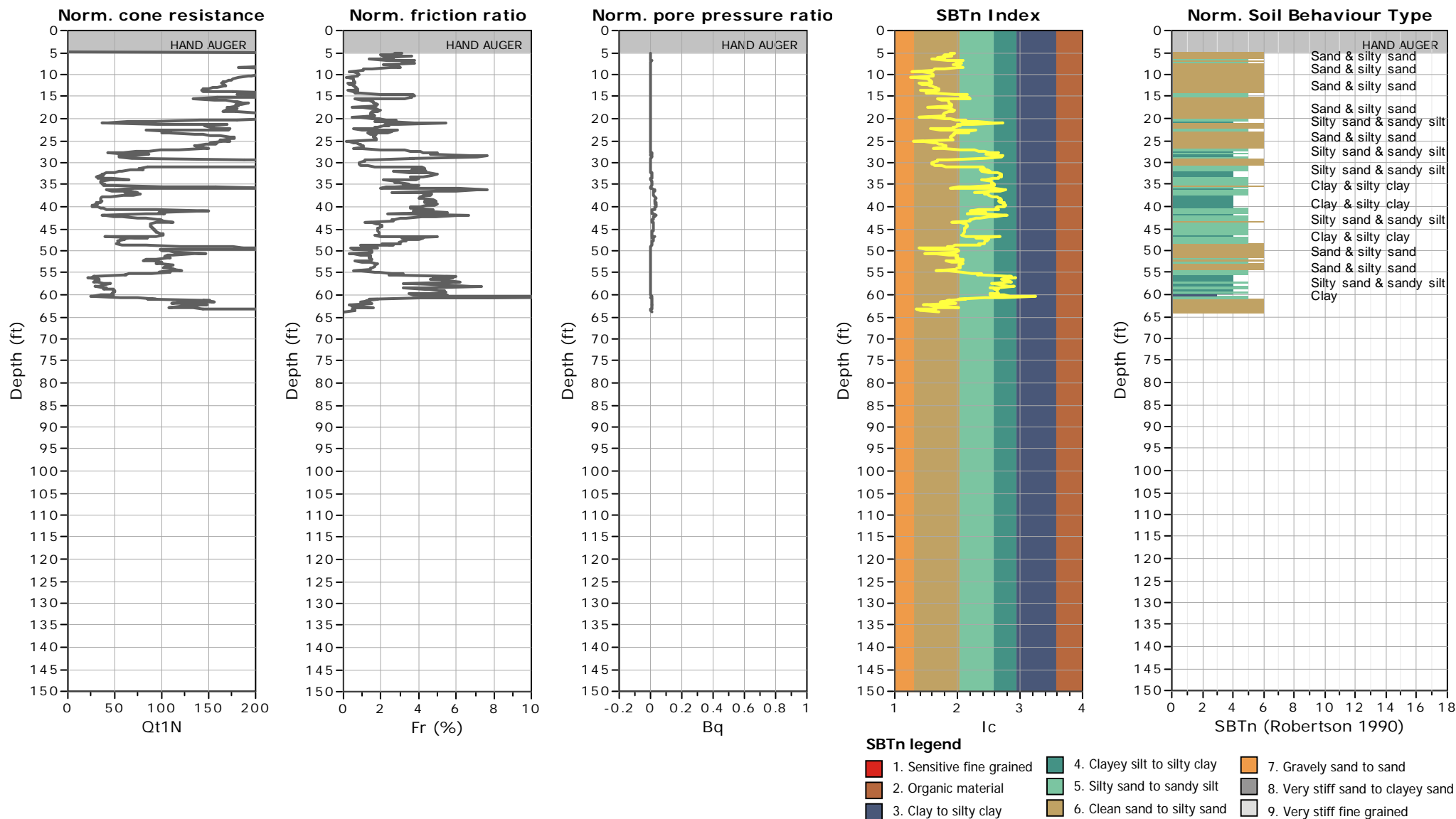
SBT - Bq plots (normalized)



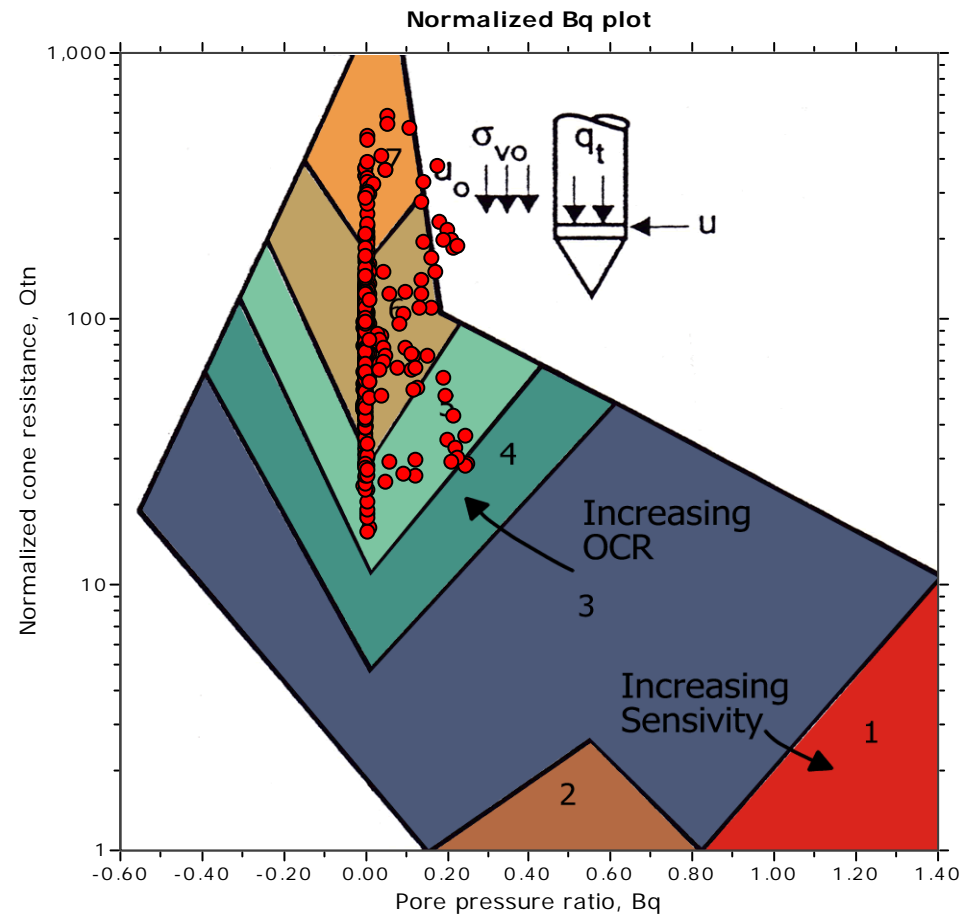
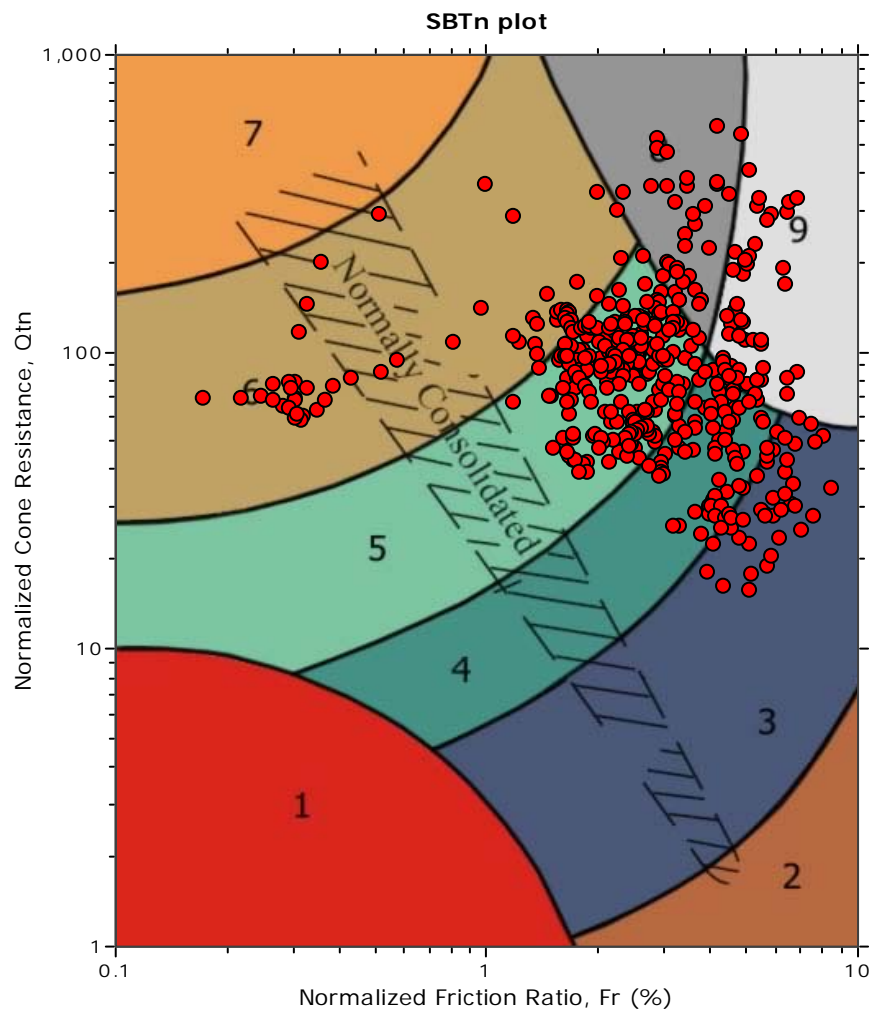
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



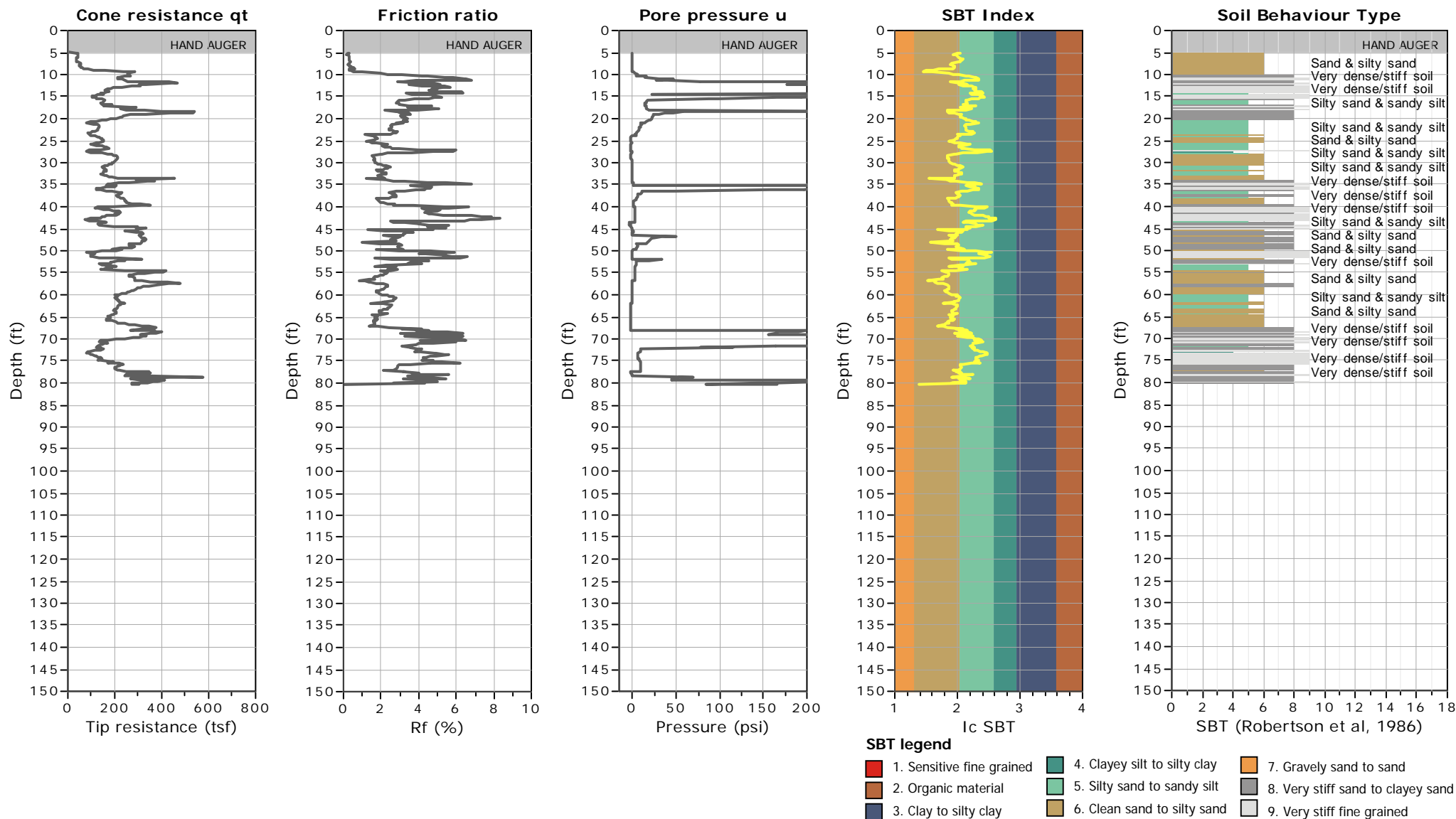


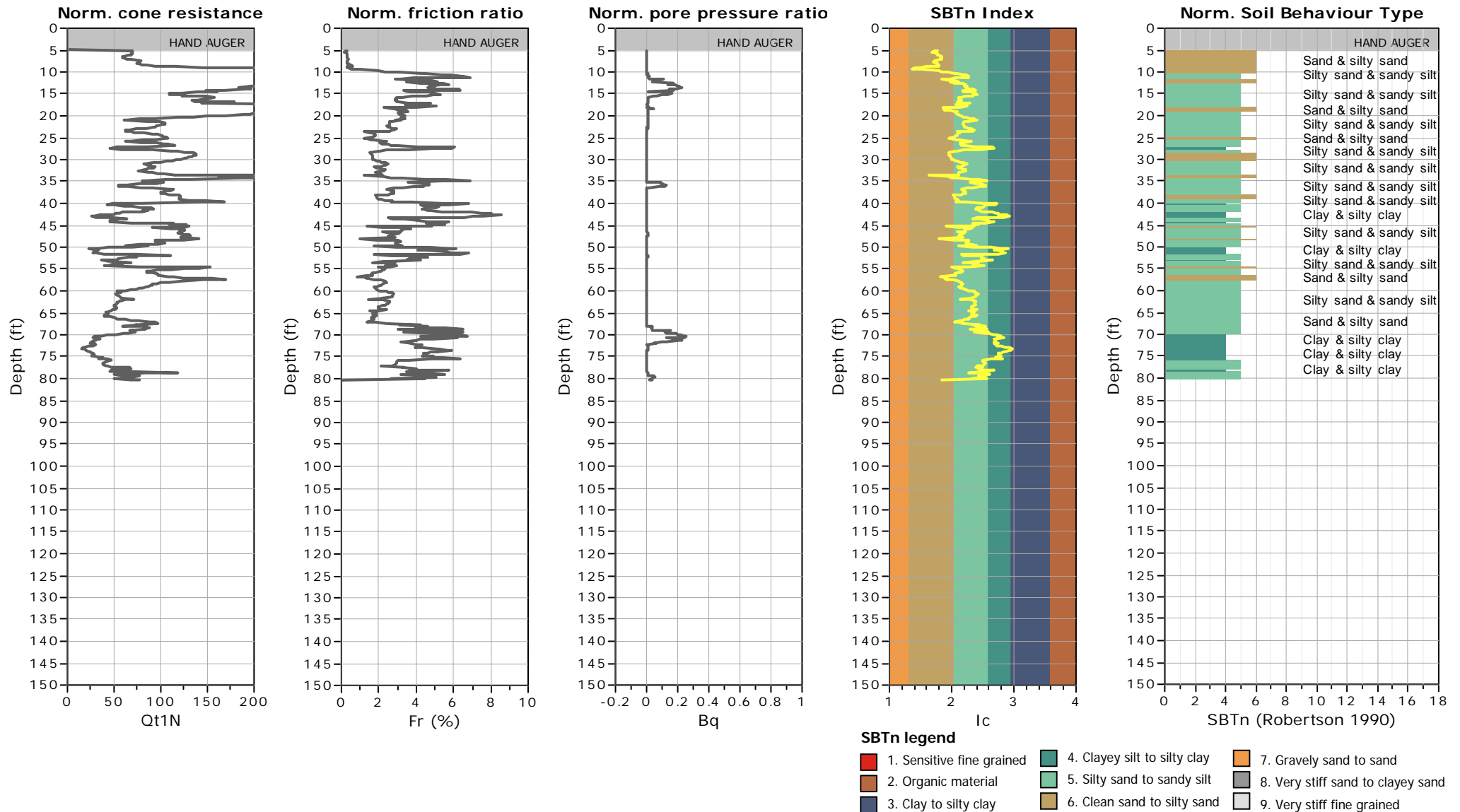
SBT - Bq plots (normalized)



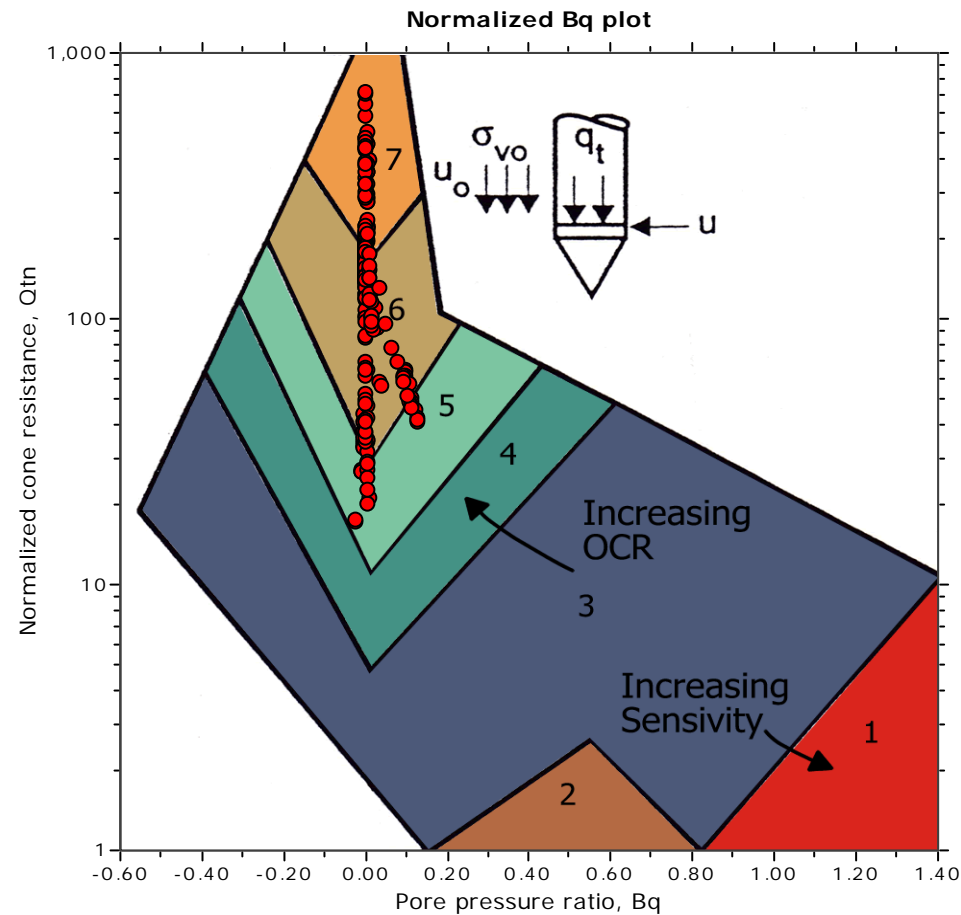
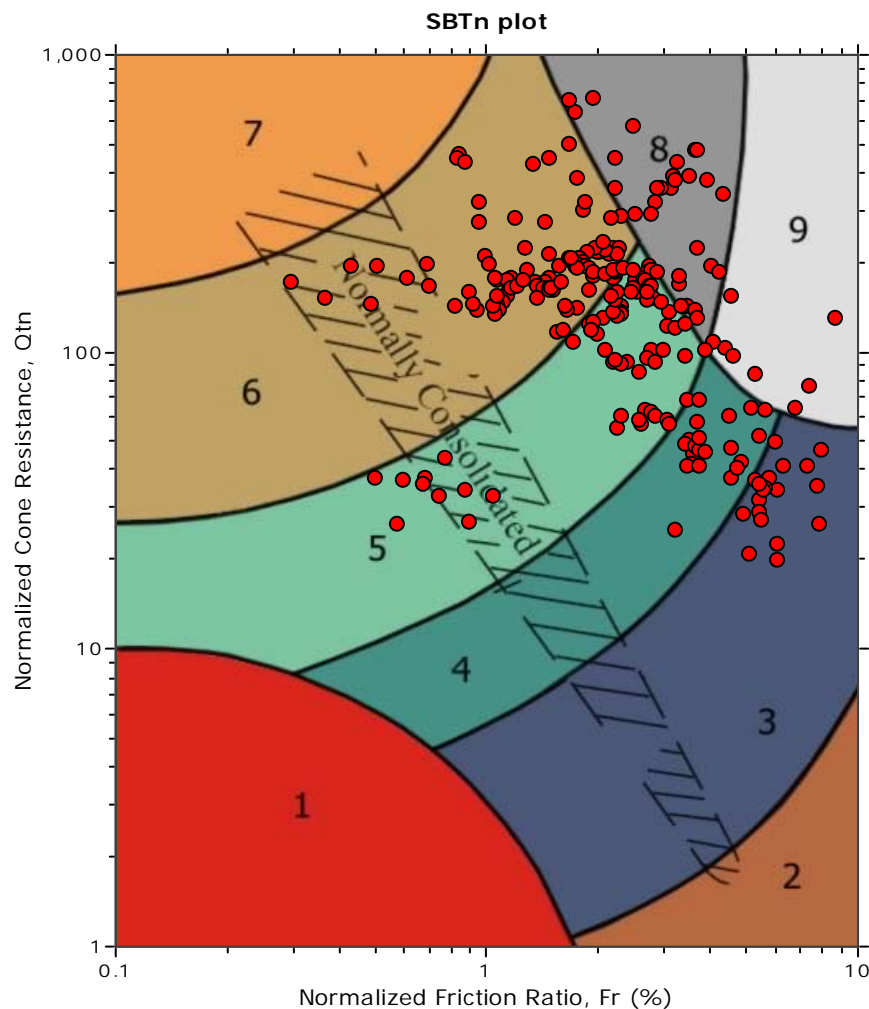
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



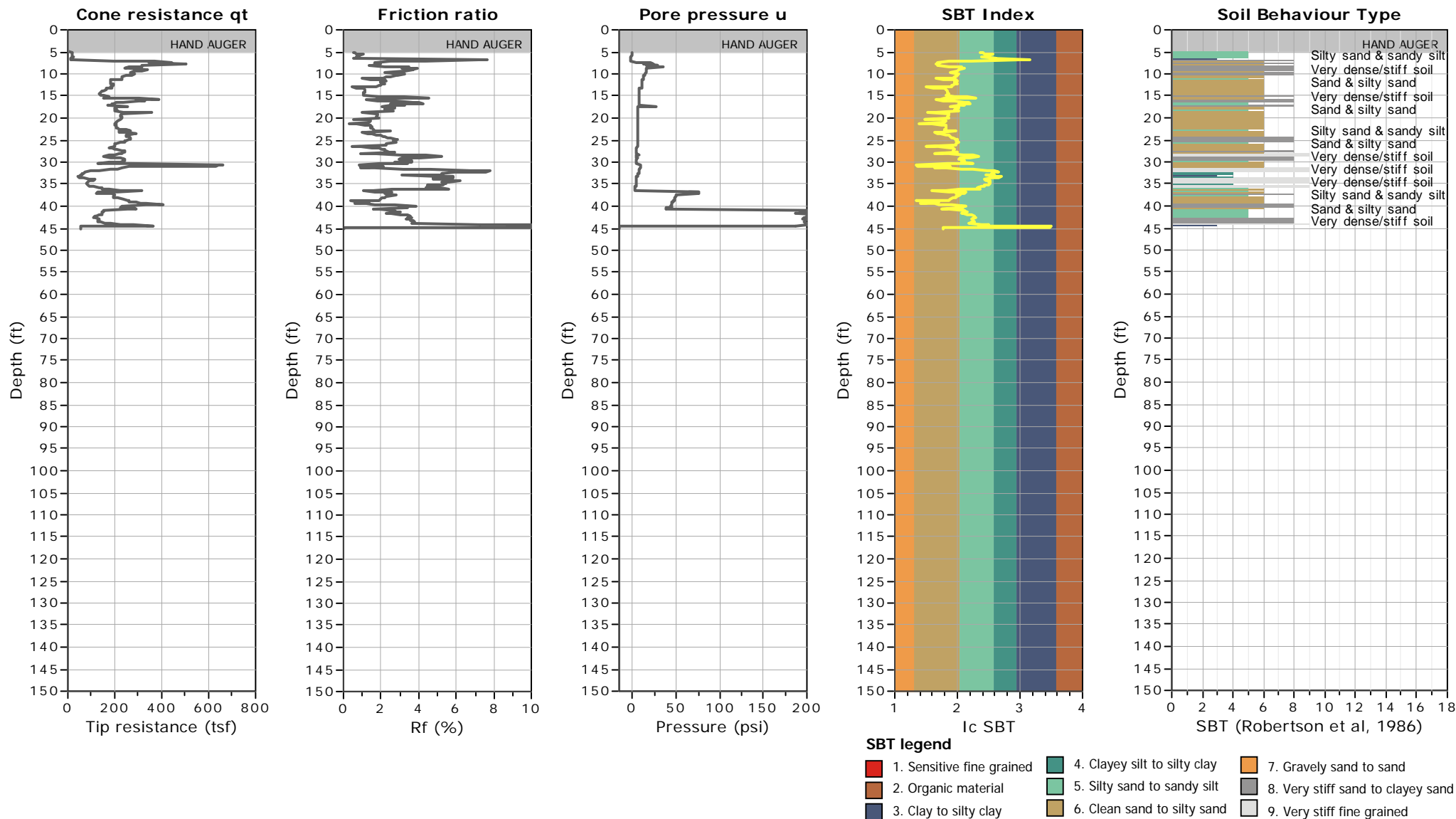


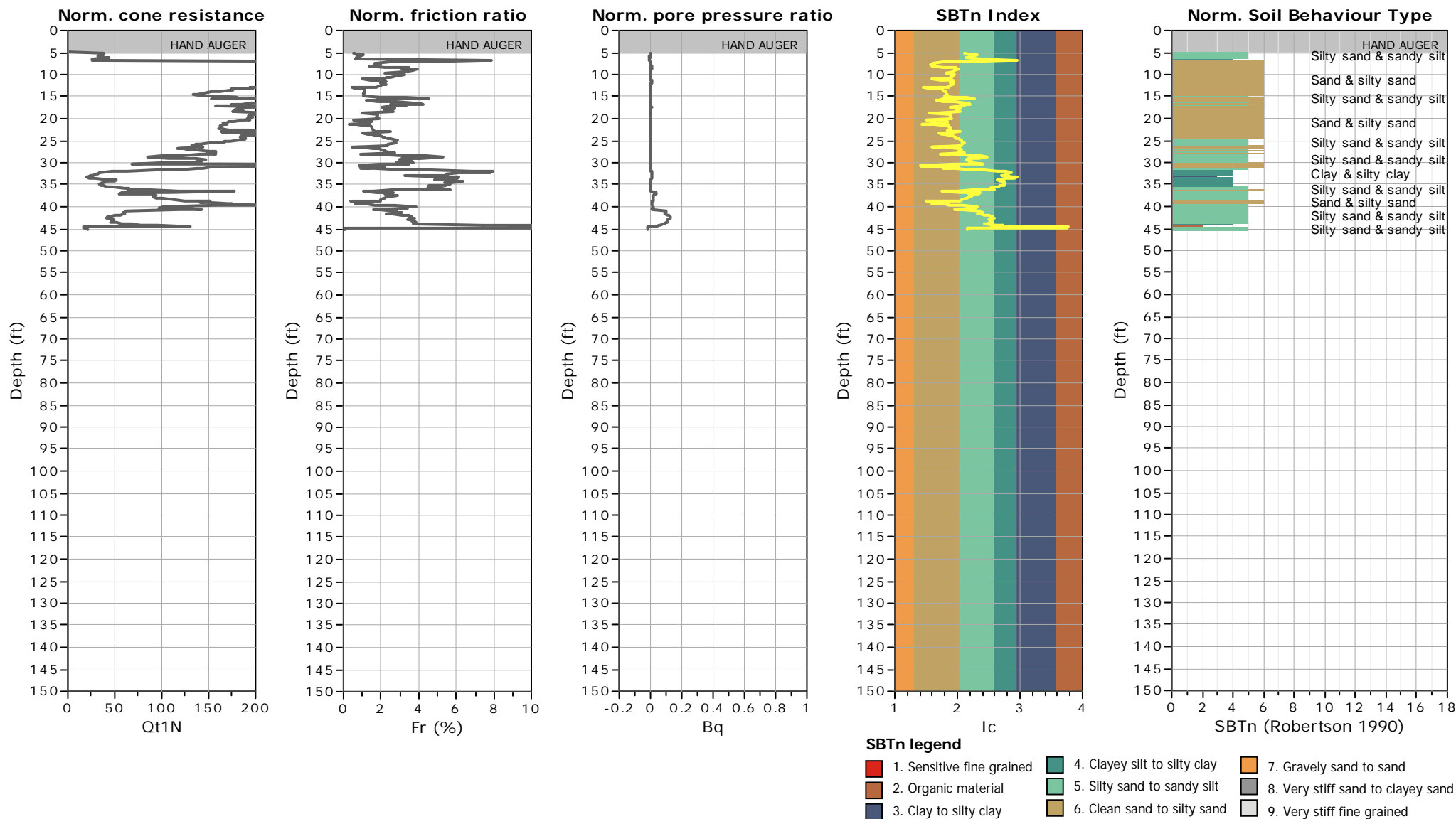
SBT - Bq plots (normalized)



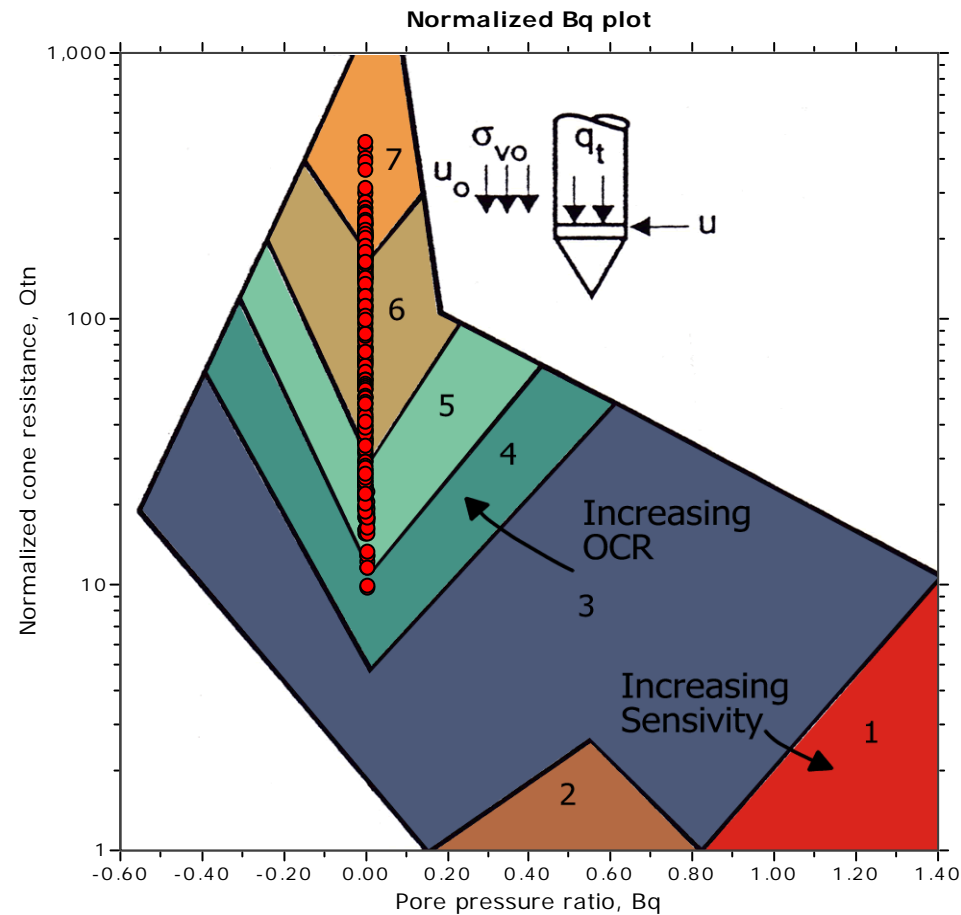
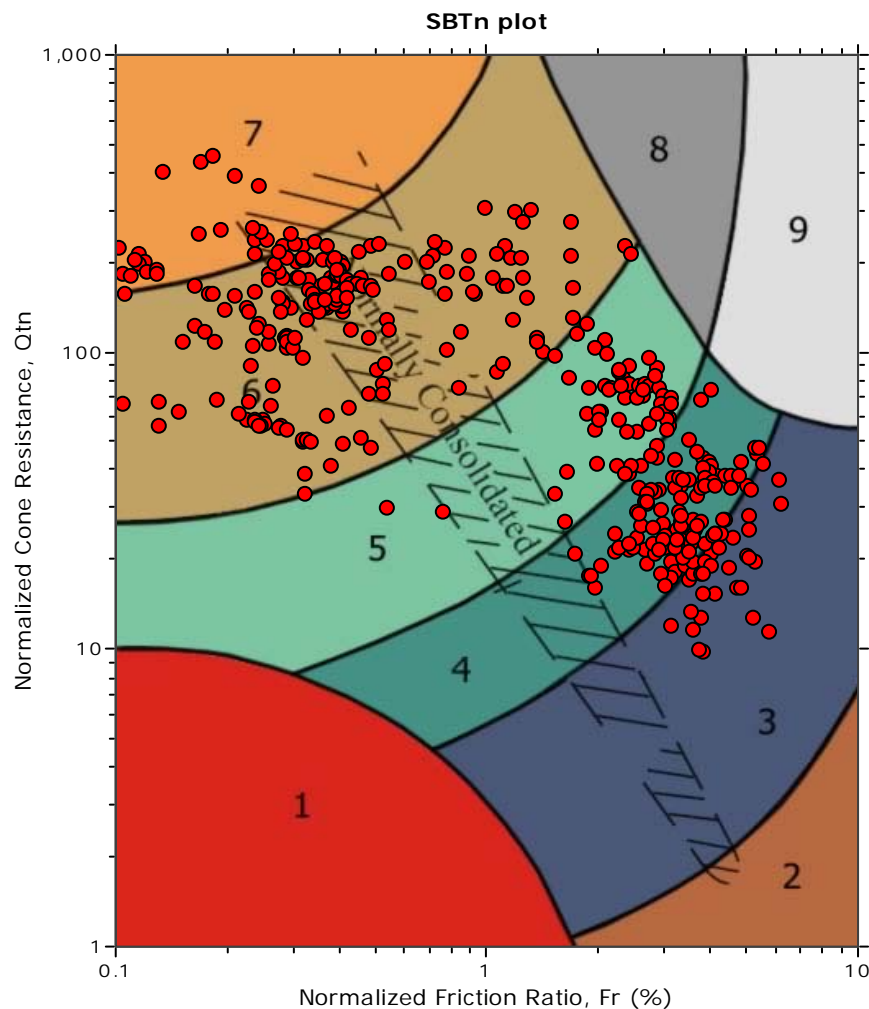
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



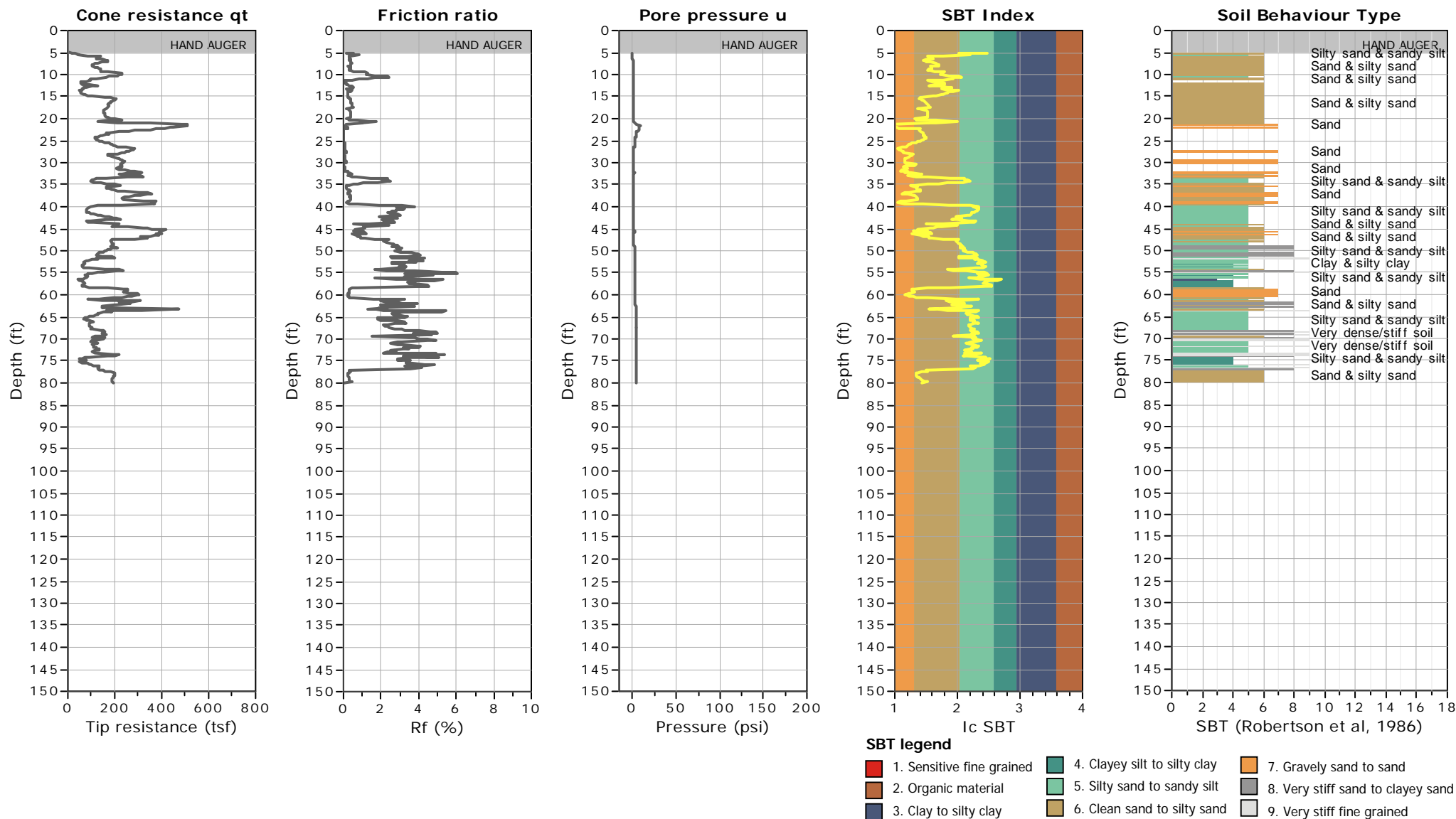


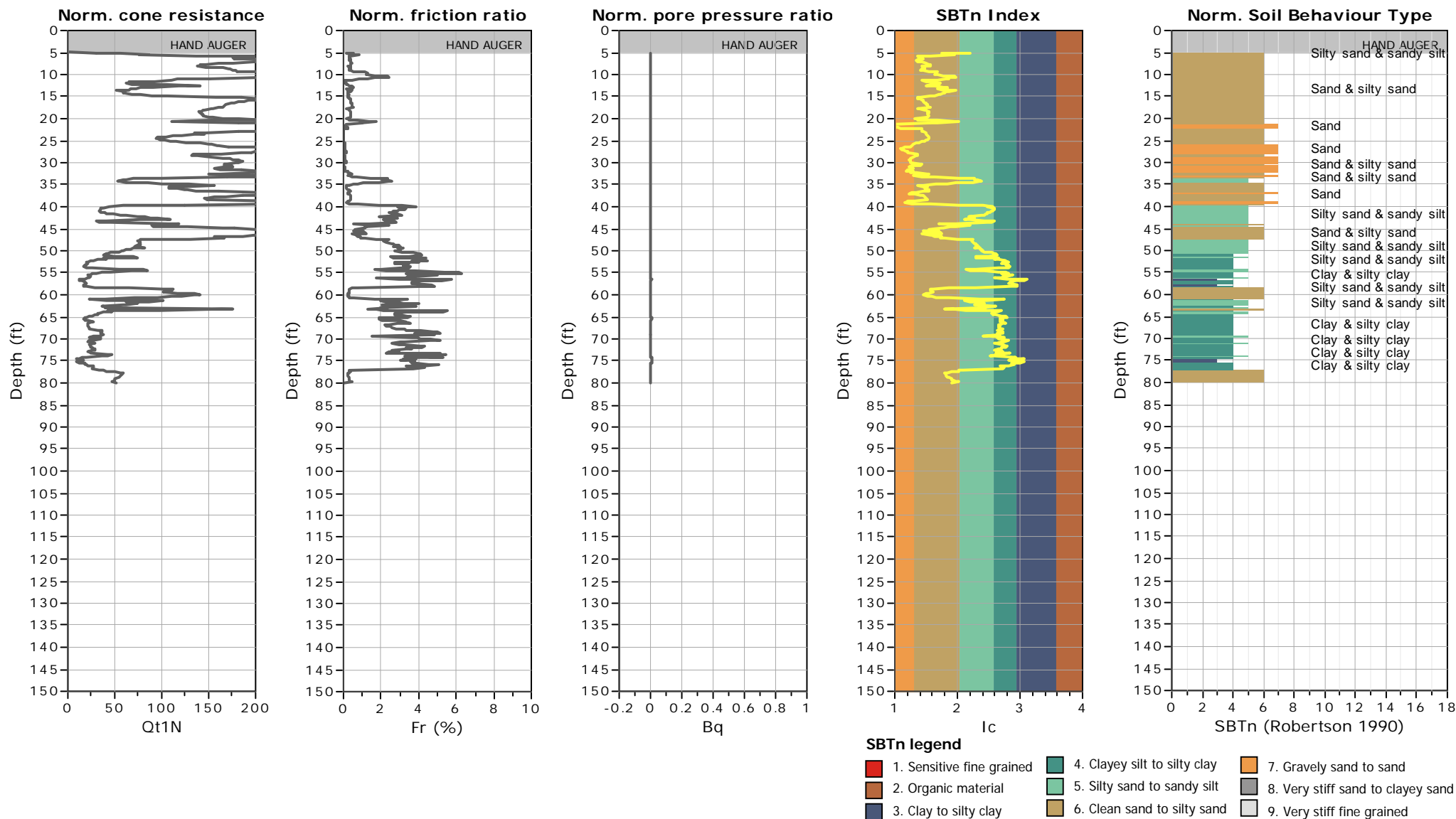
SBT - Bq plots (normalized)



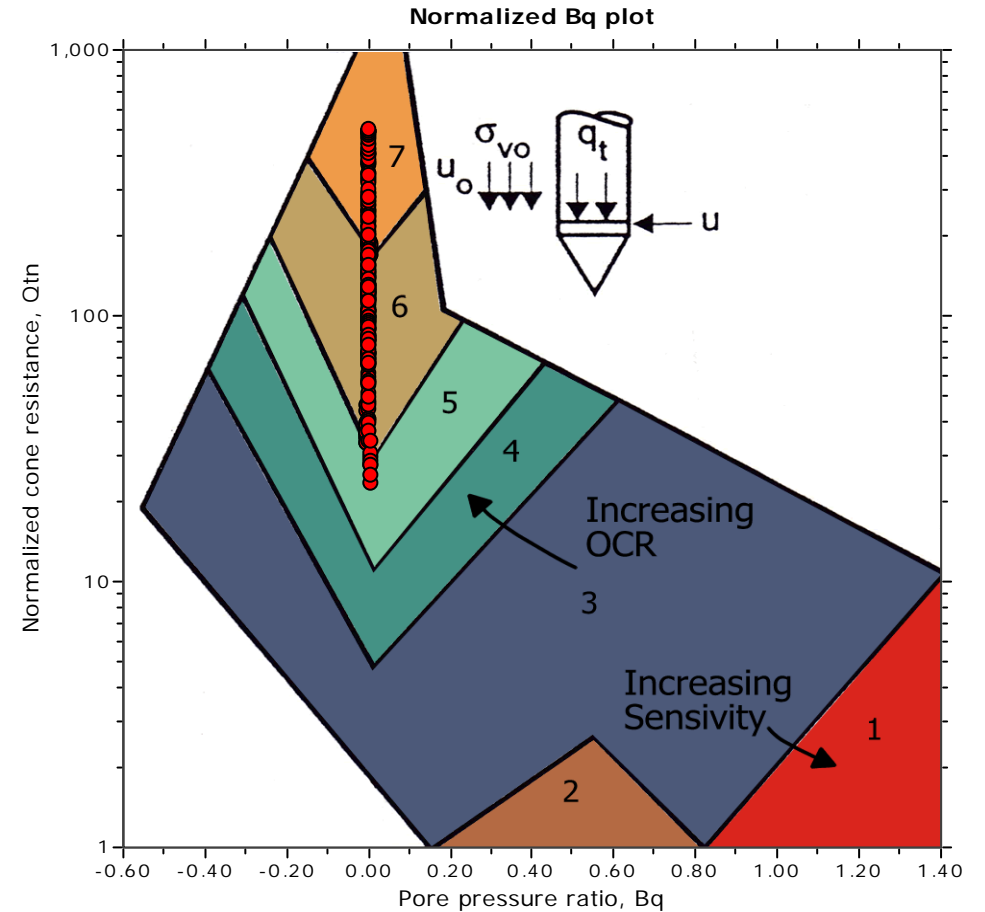
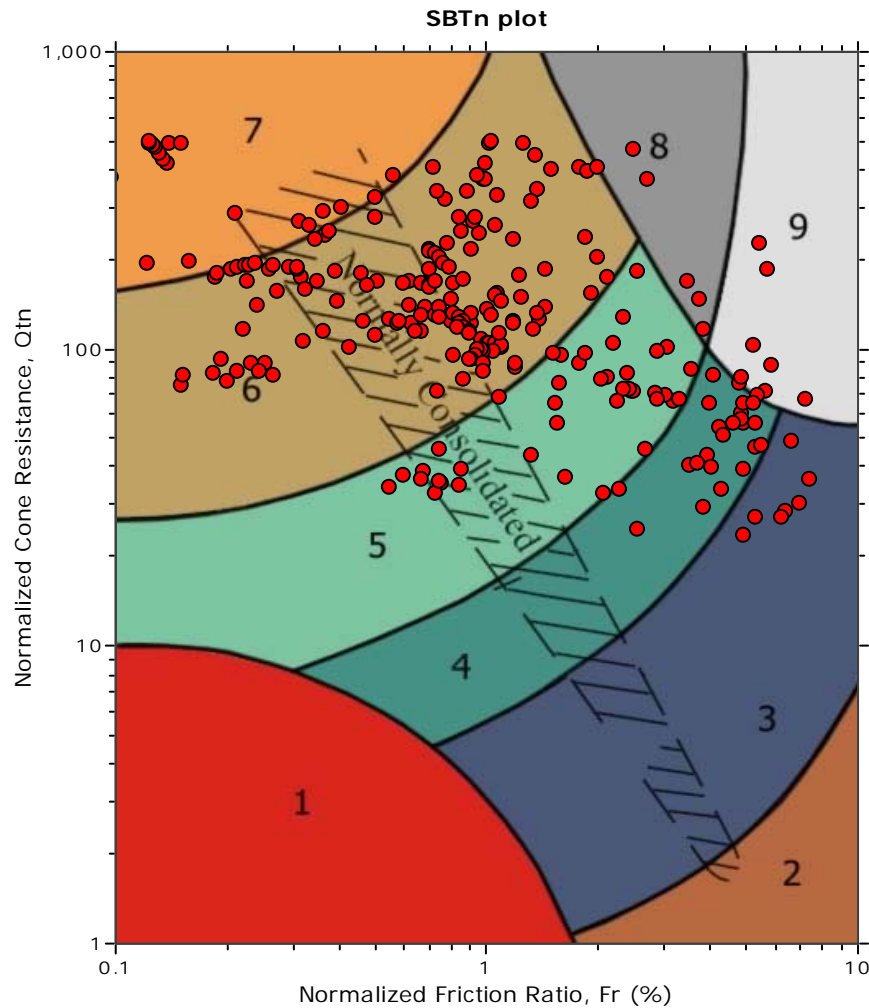
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



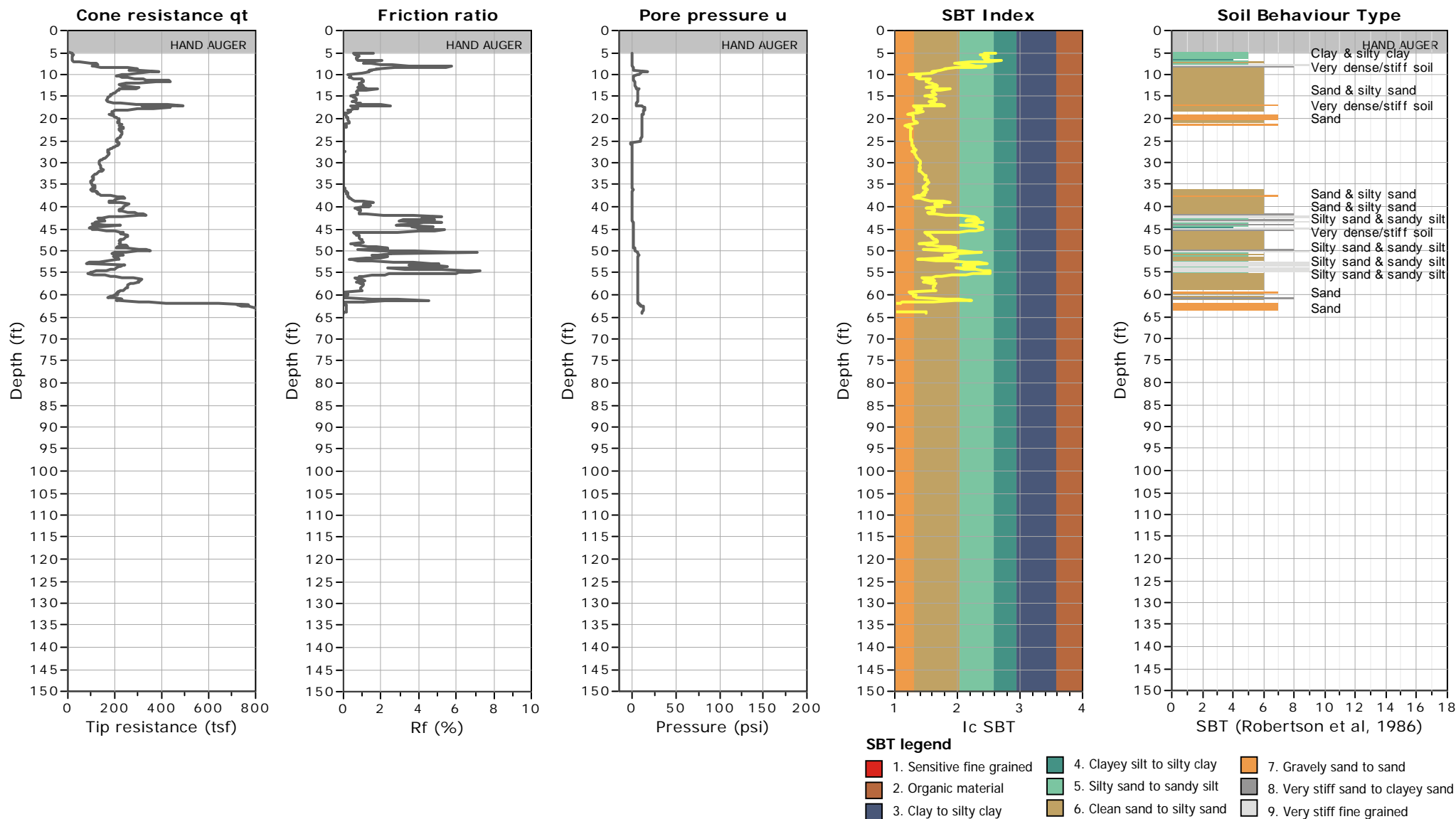


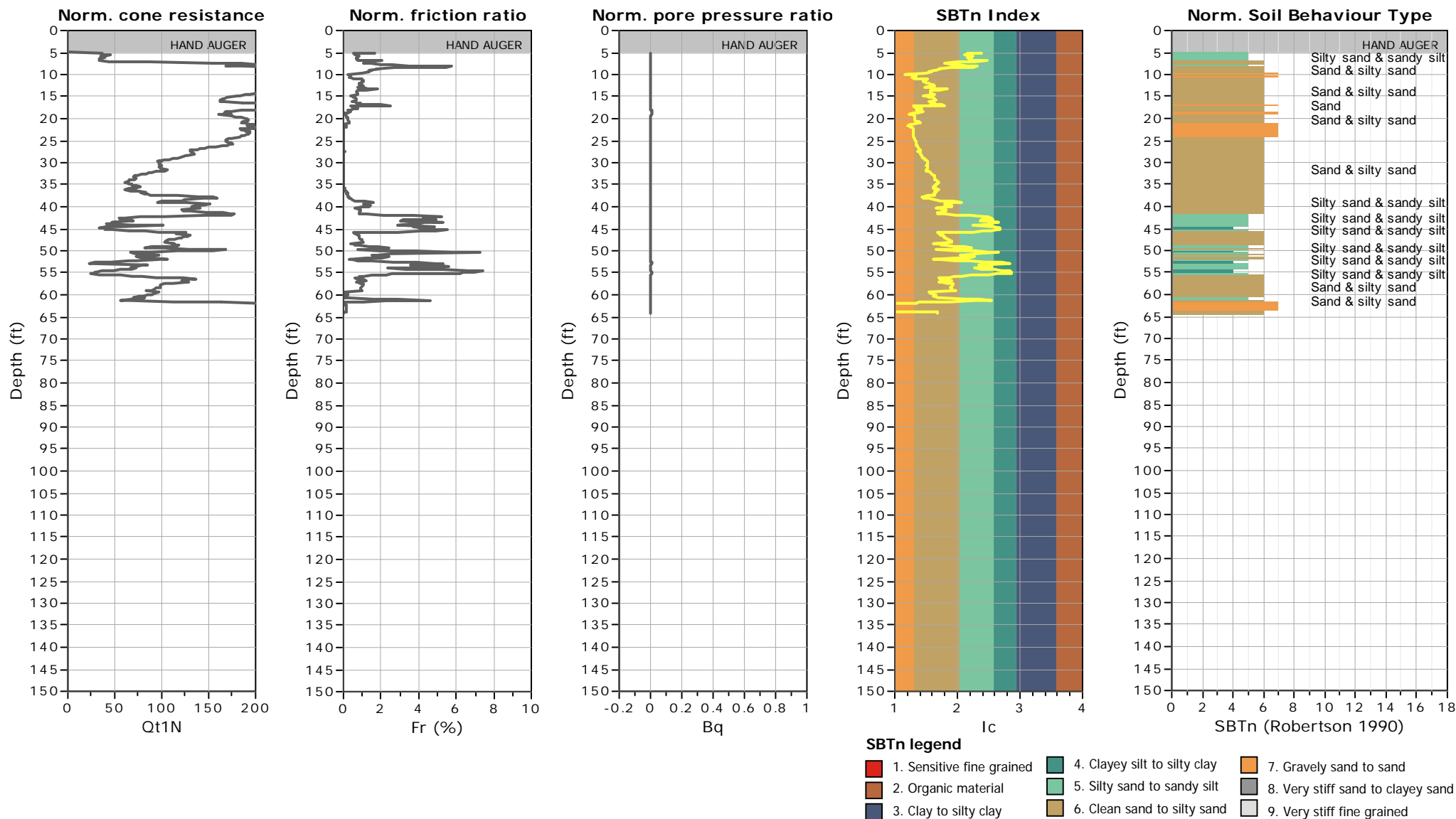
SBT - Bq plots (normalized)



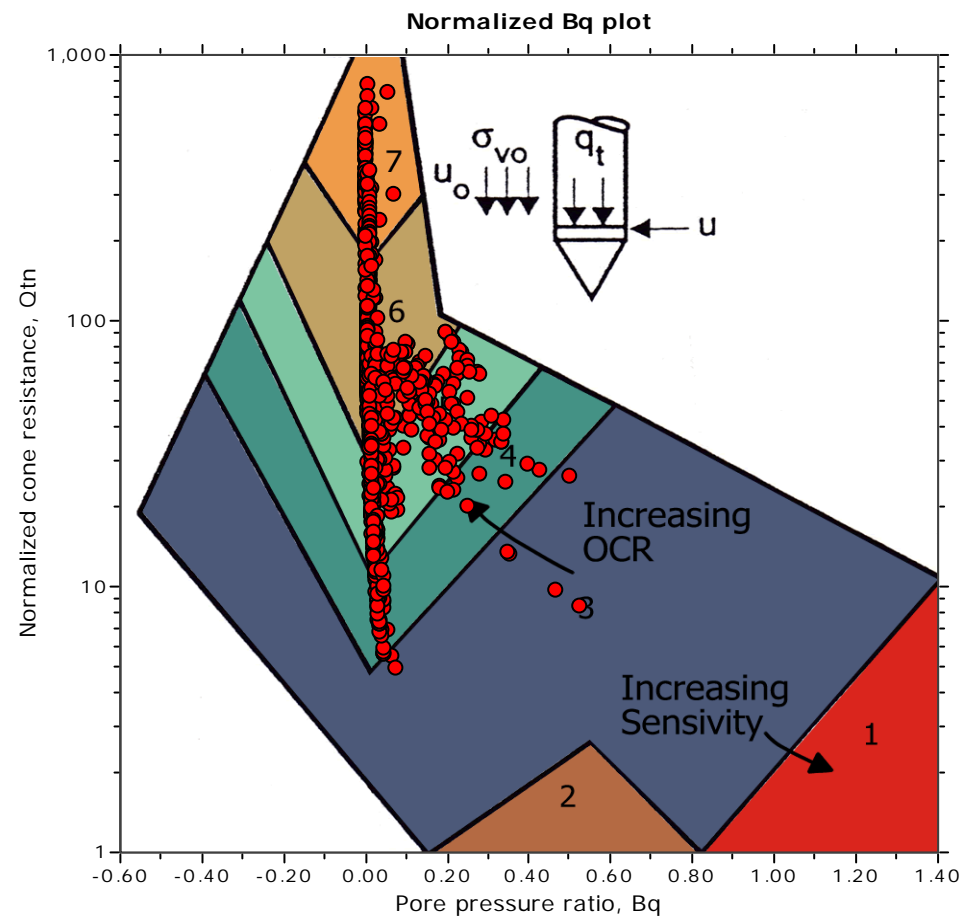
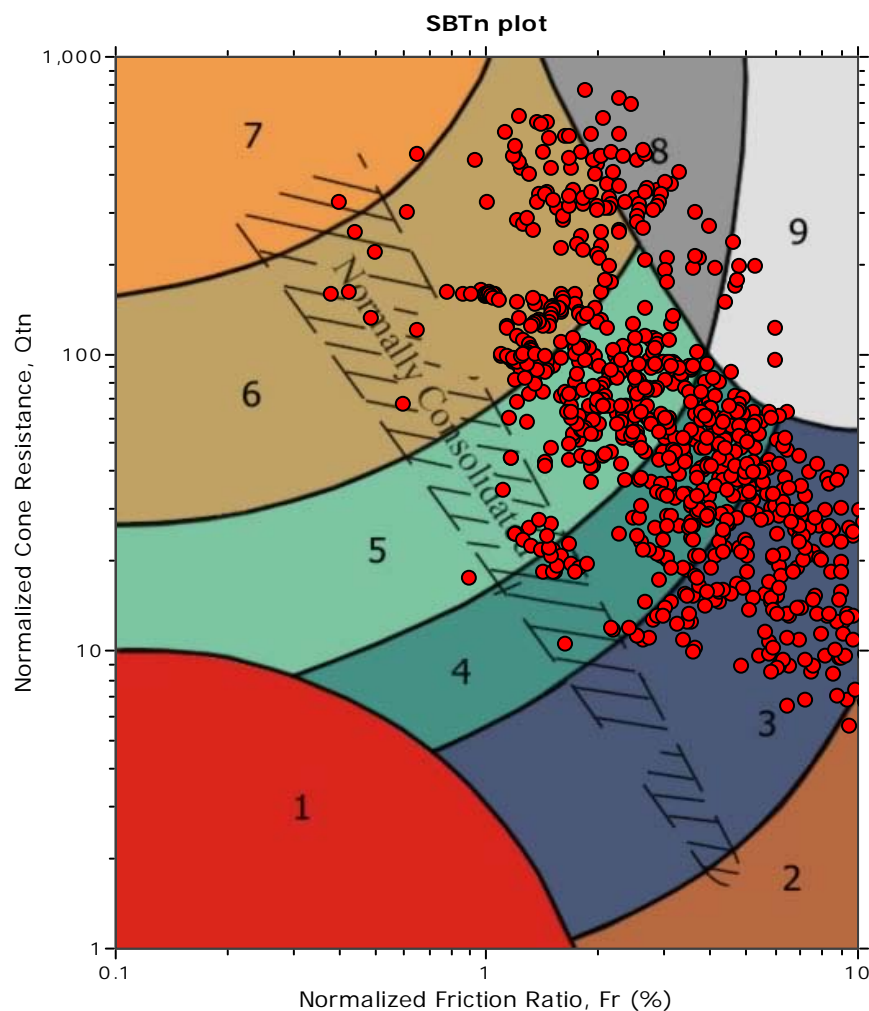
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



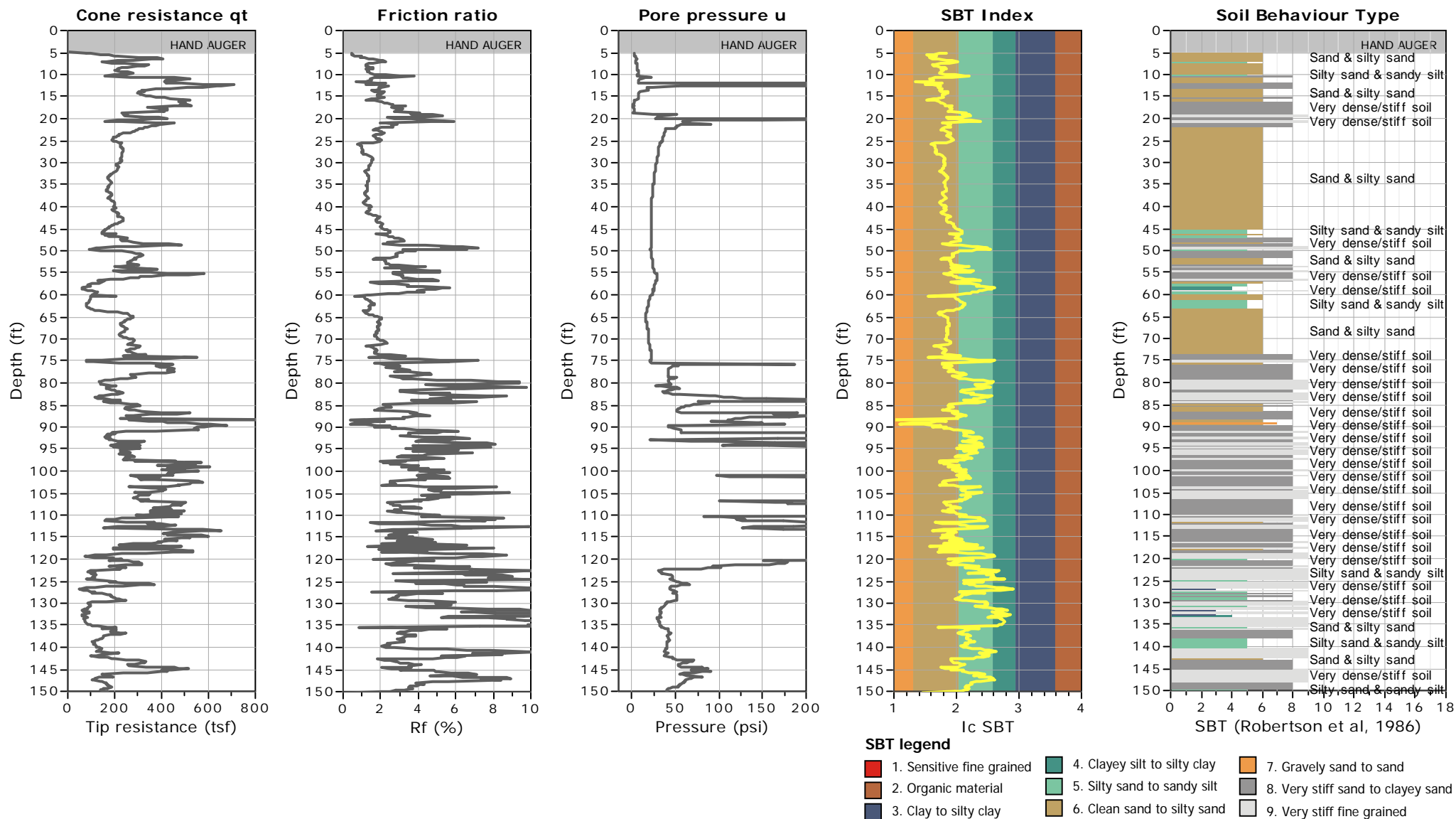


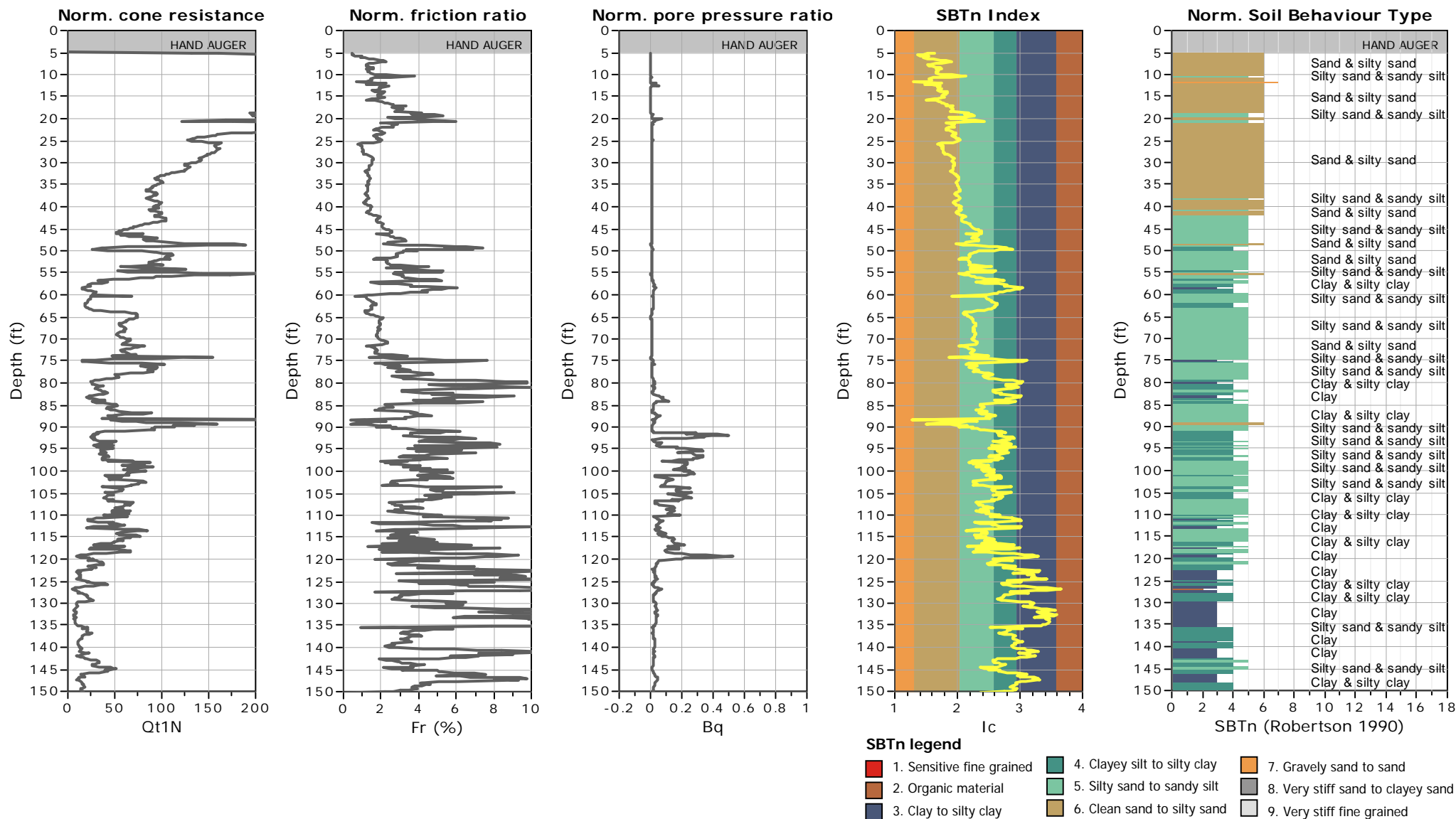
SBT - Bq plots (normalized)



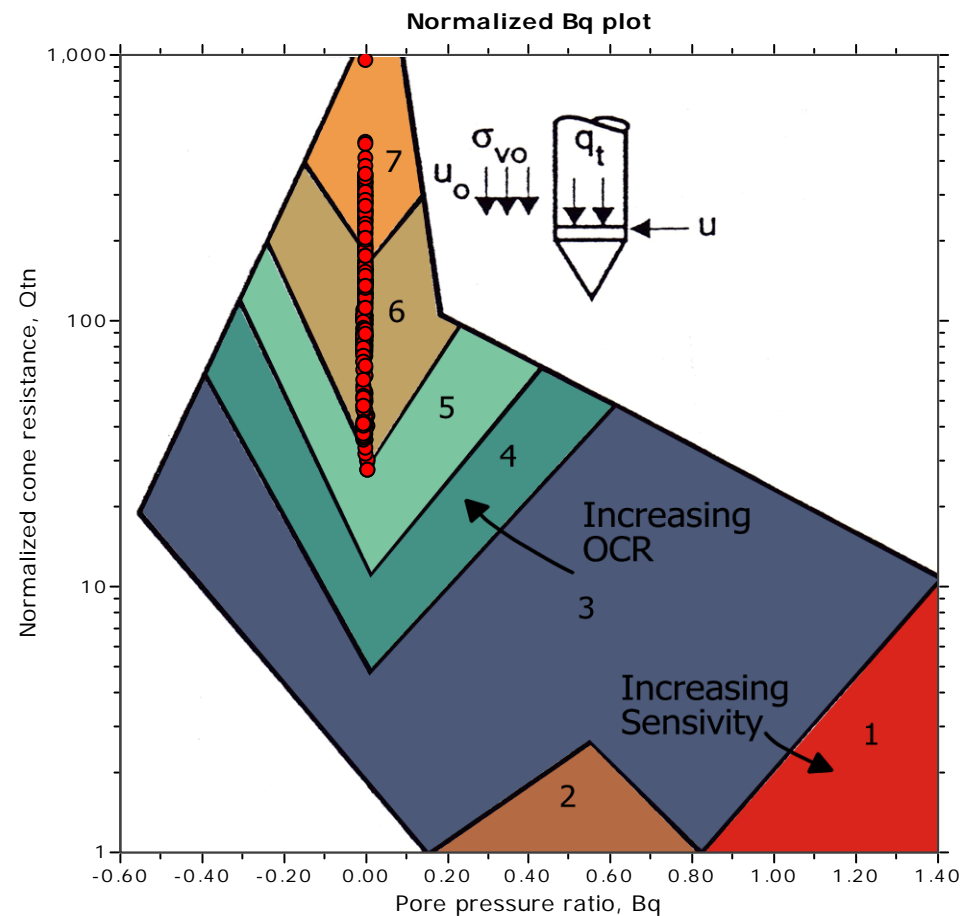
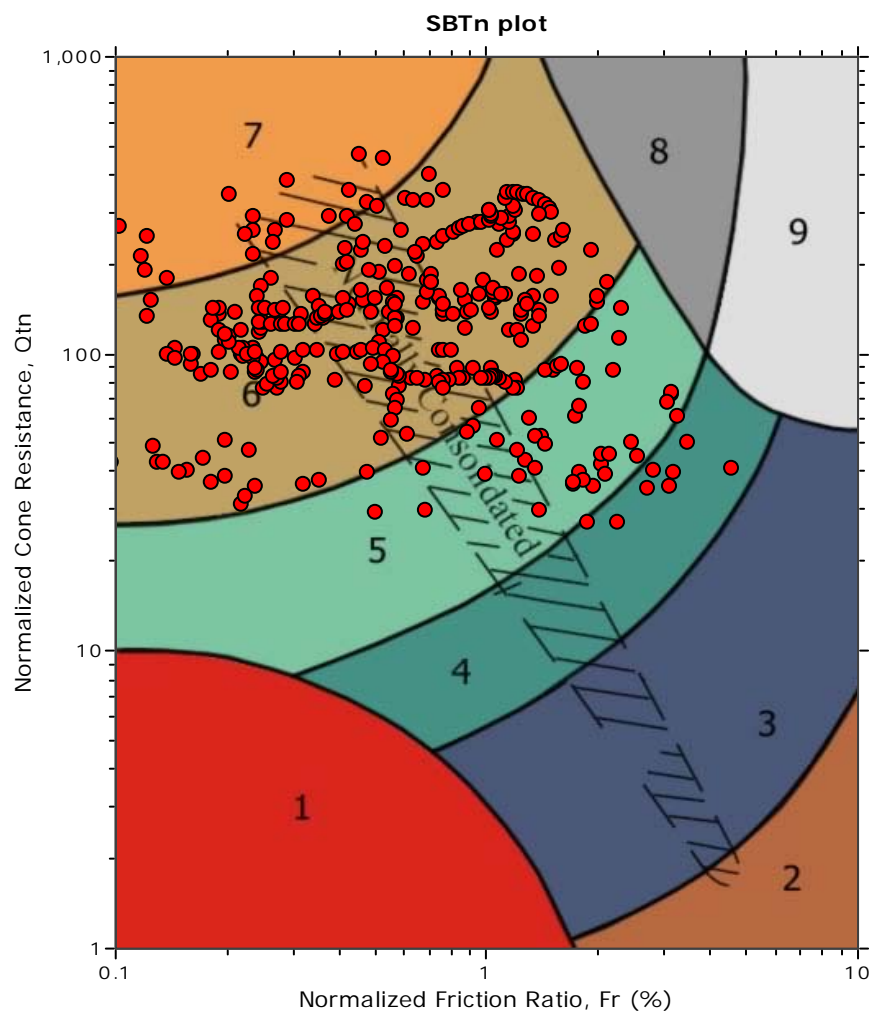
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



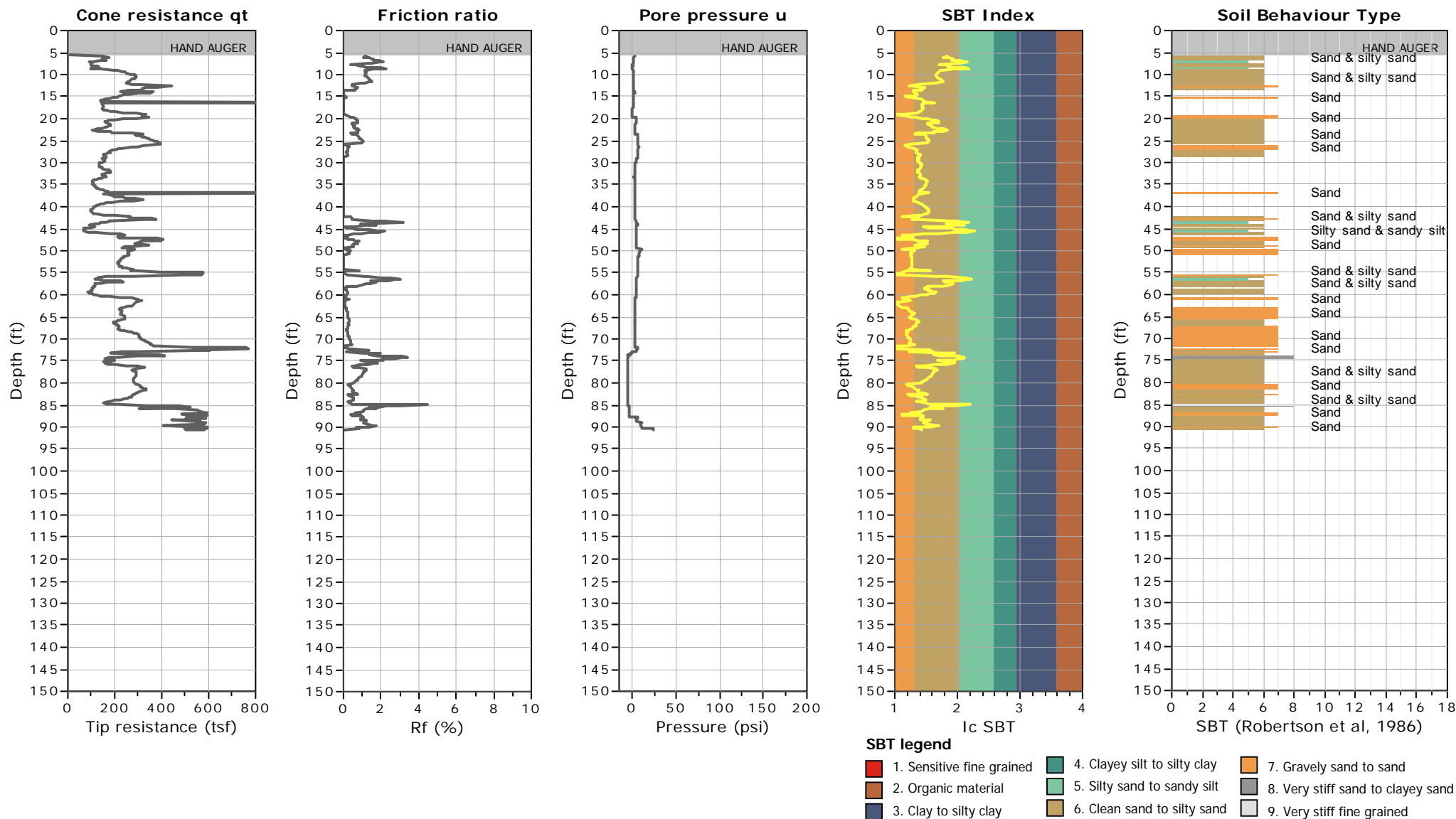


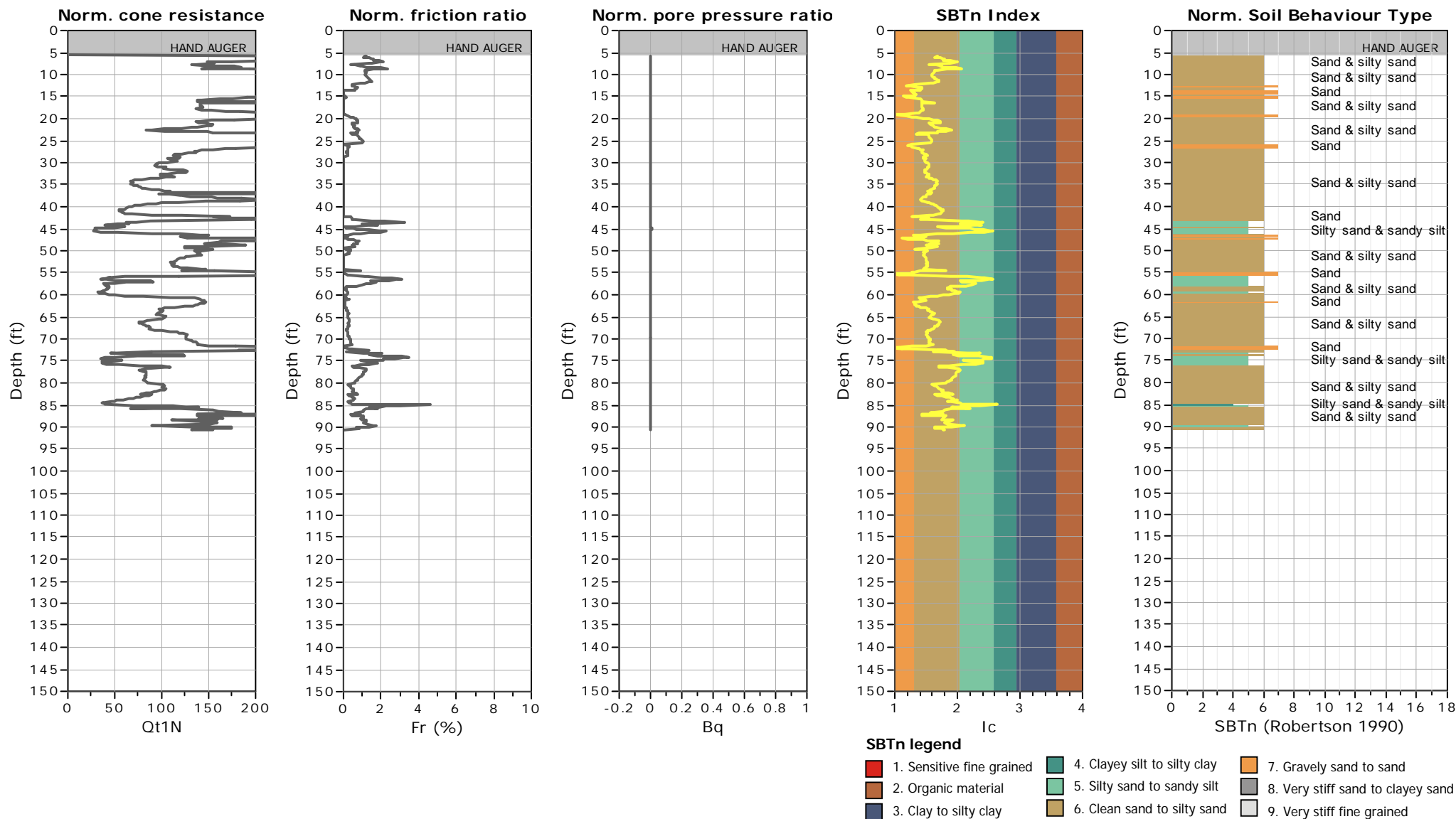
SBT - Bq plots (normalized)



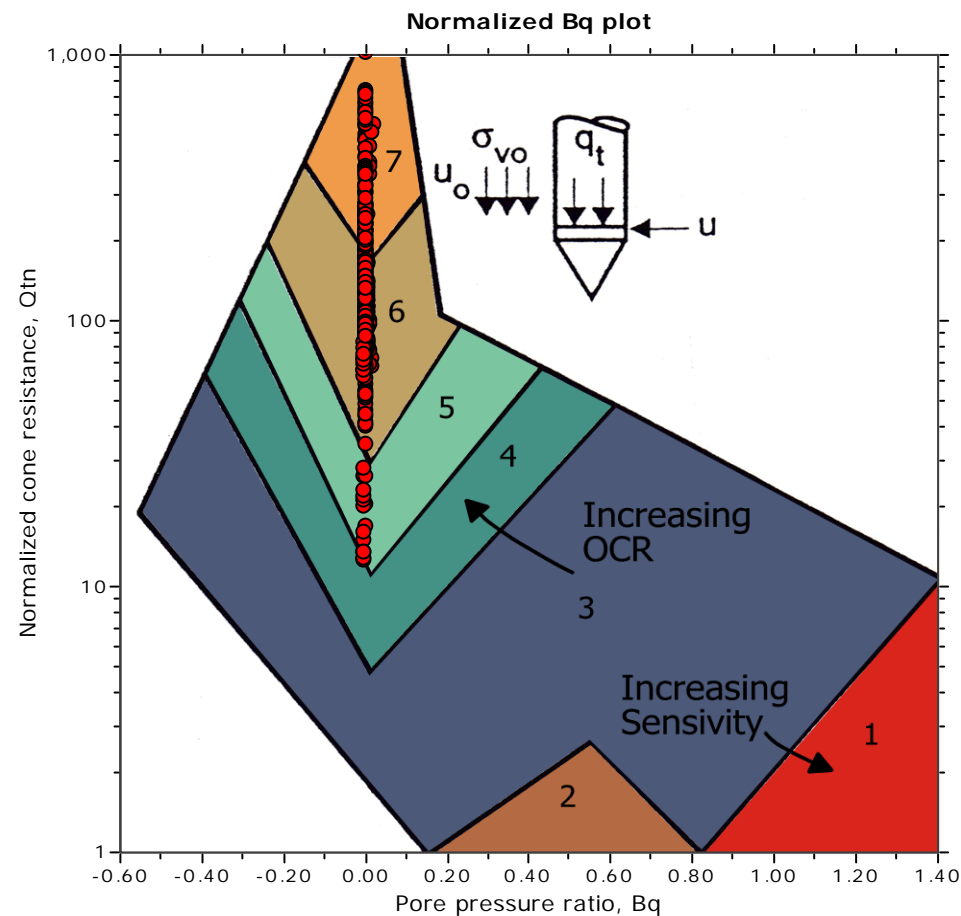
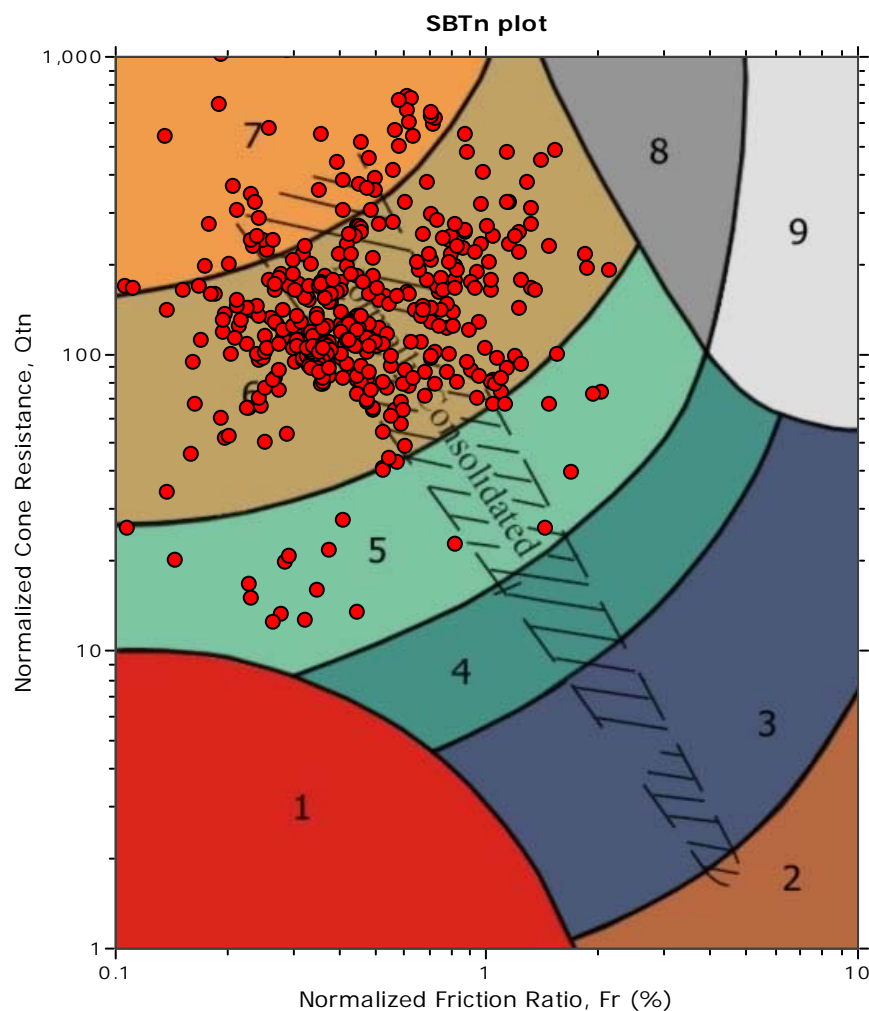
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



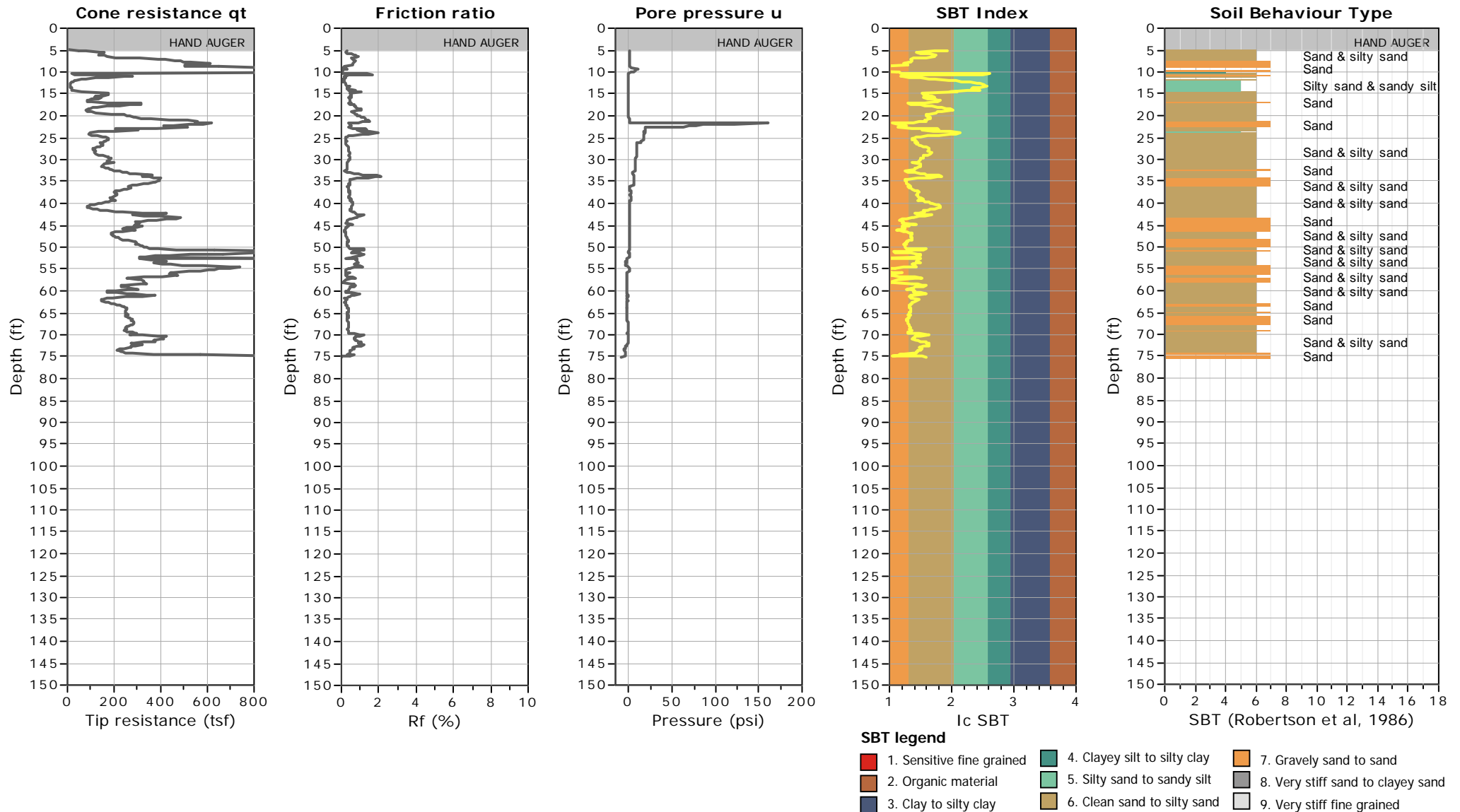


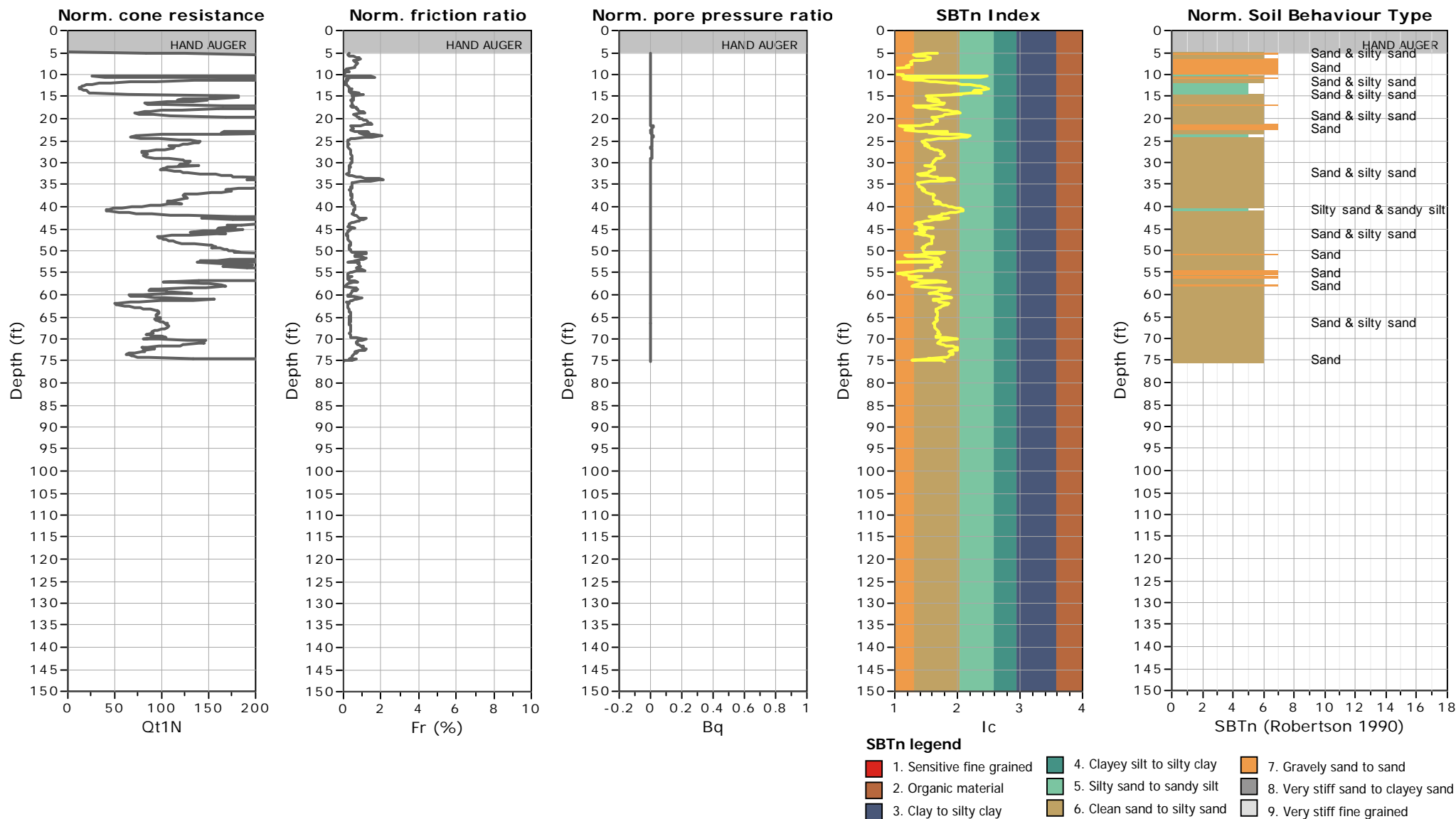
SBT - Bq plots (normalized)



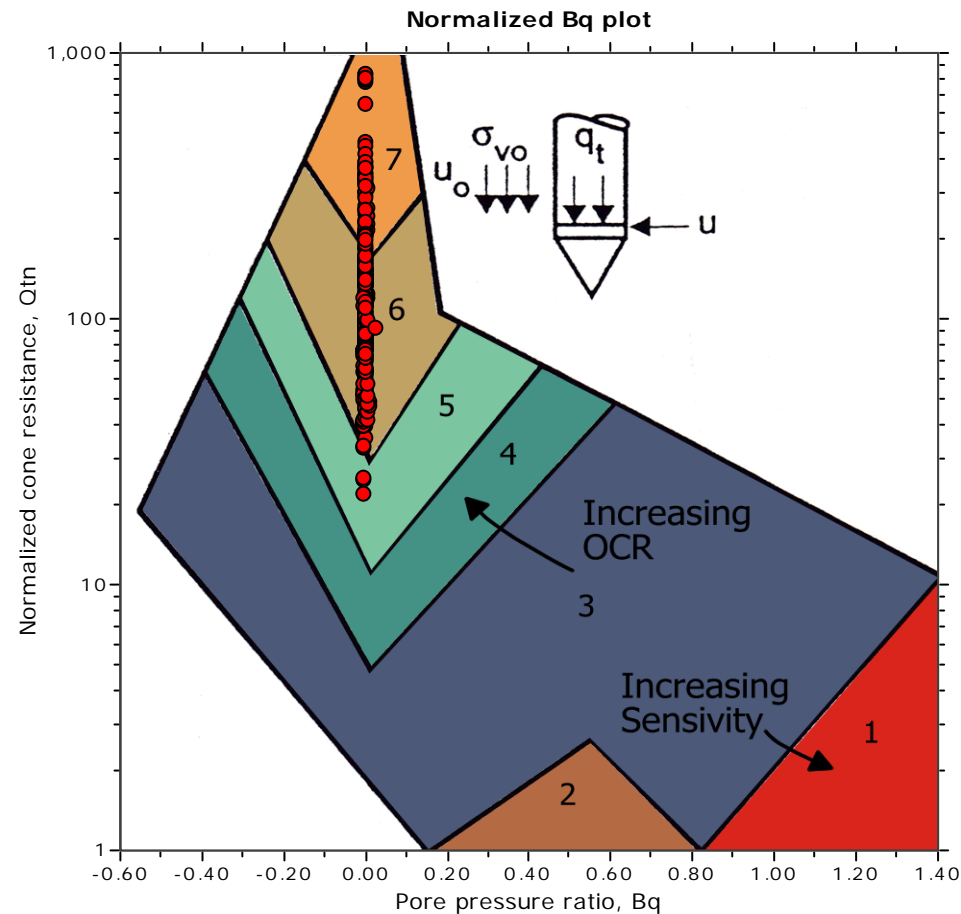
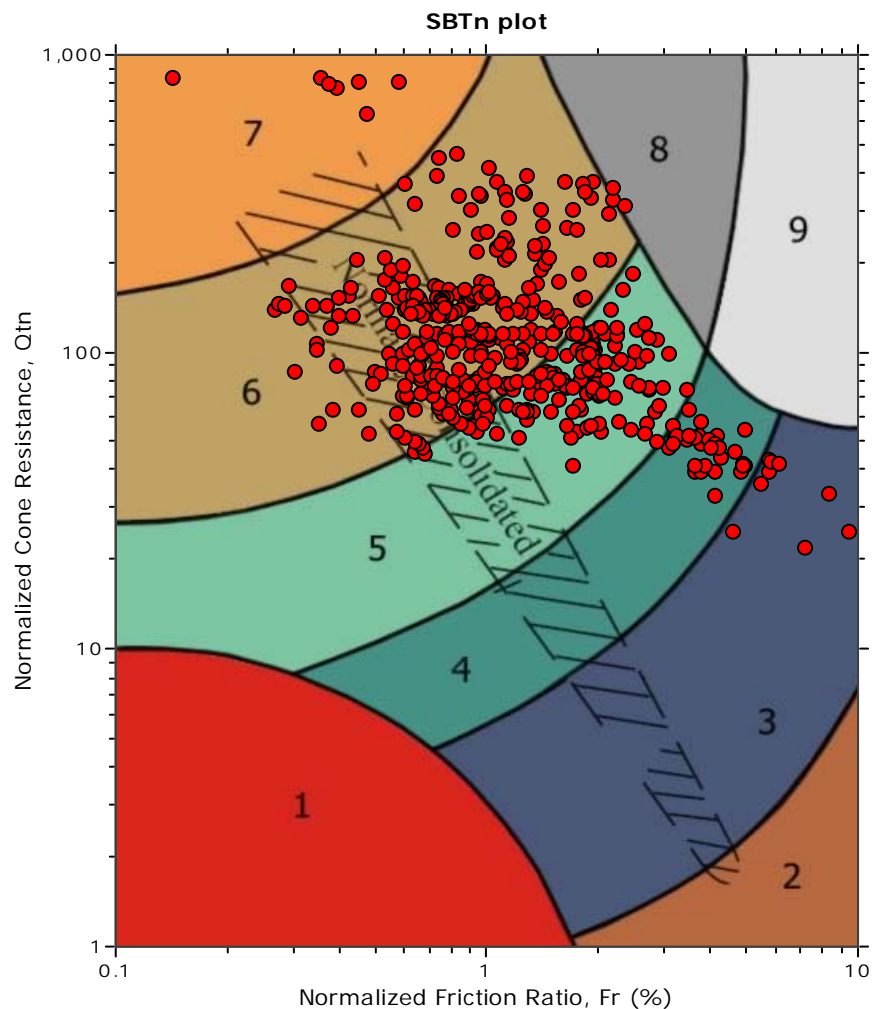
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



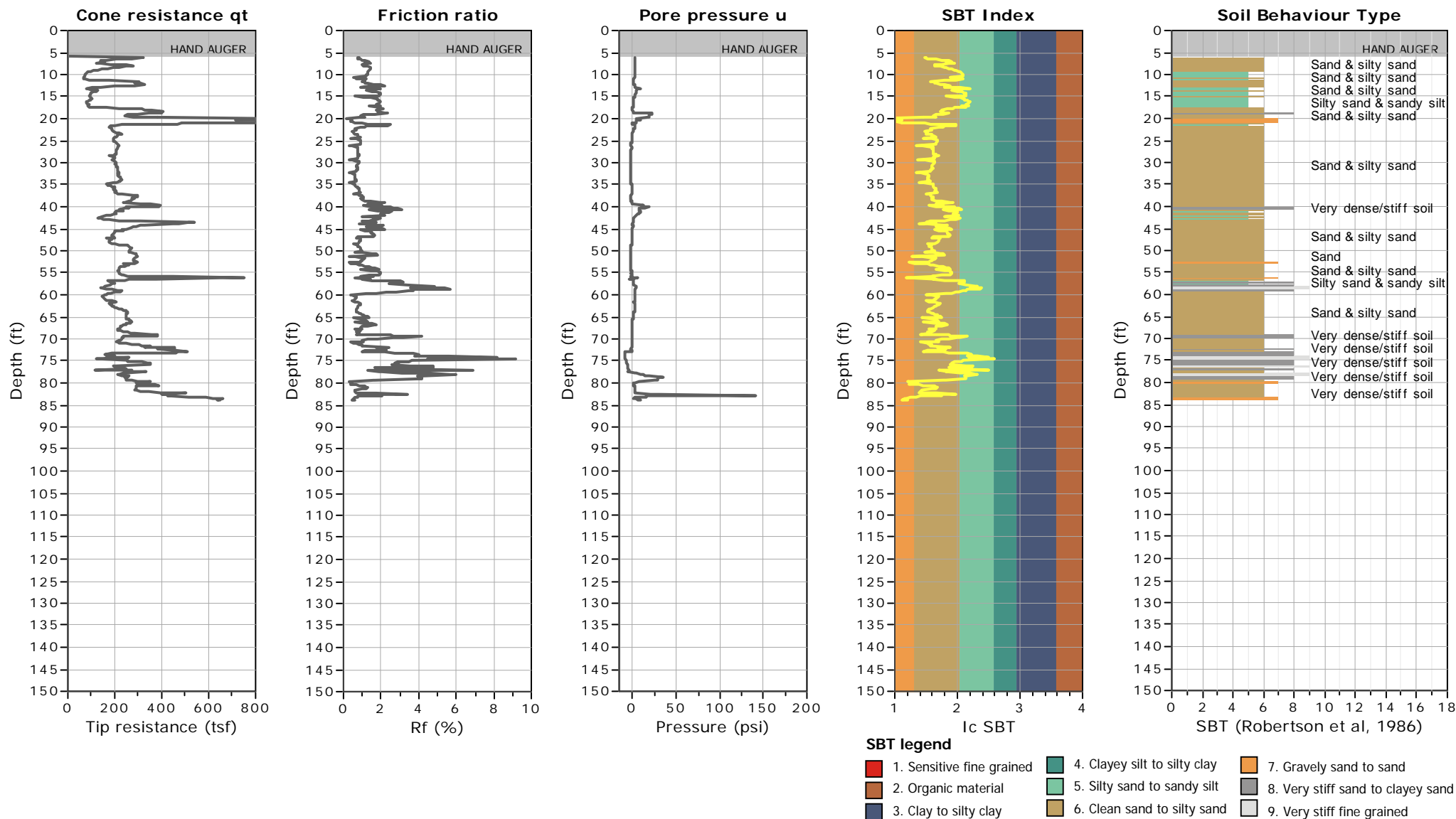


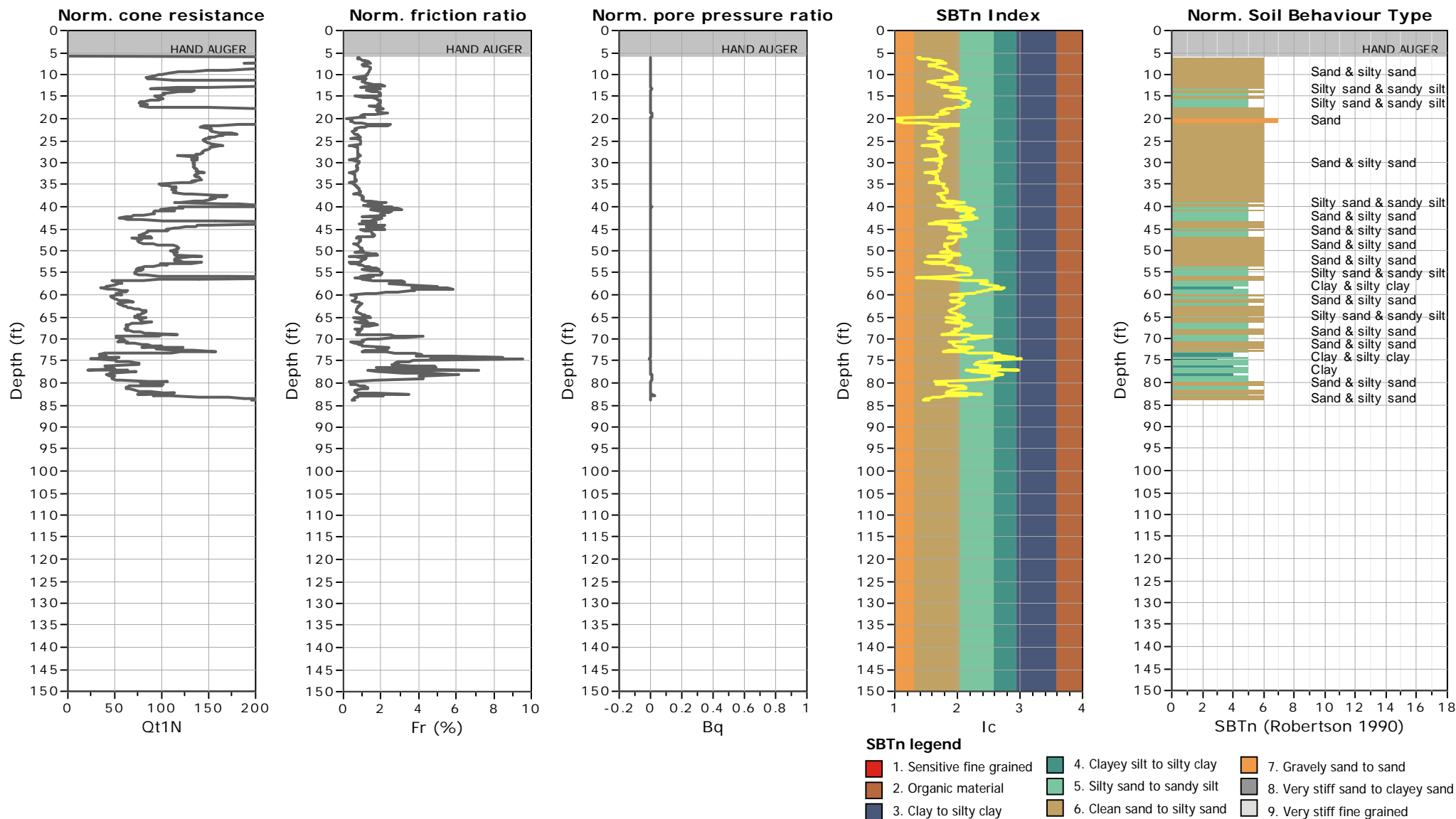
SBT - Bq plots (normalized)



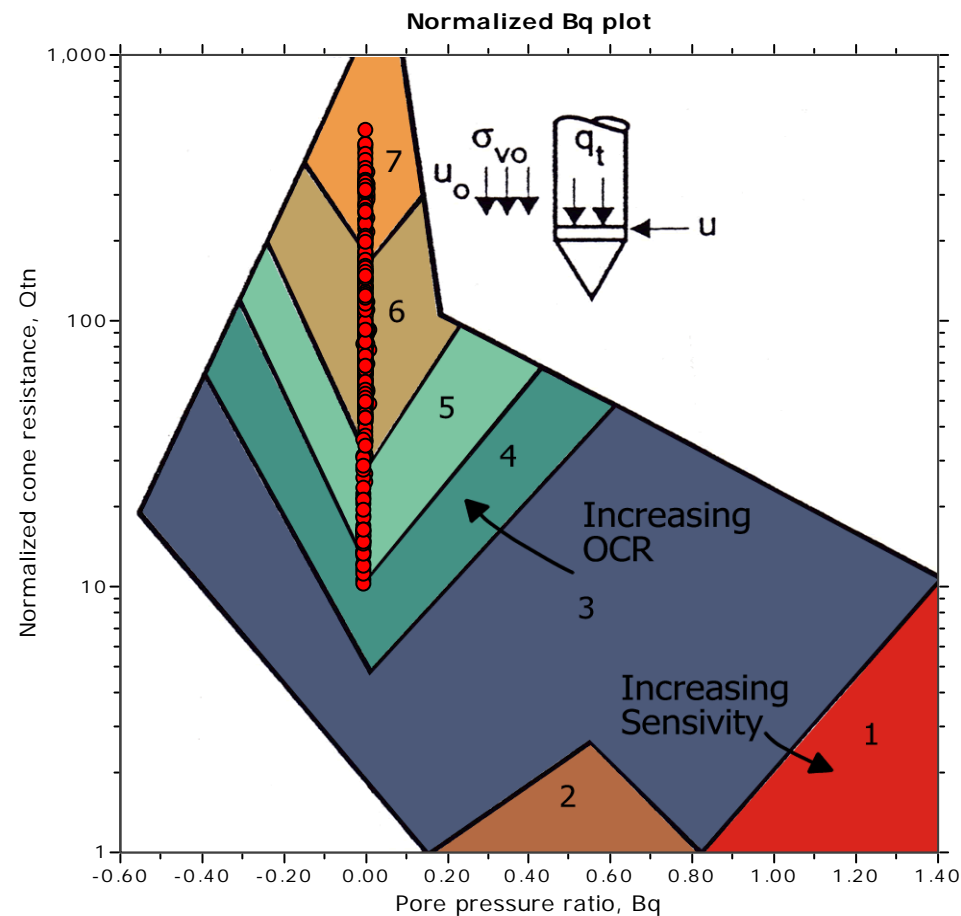
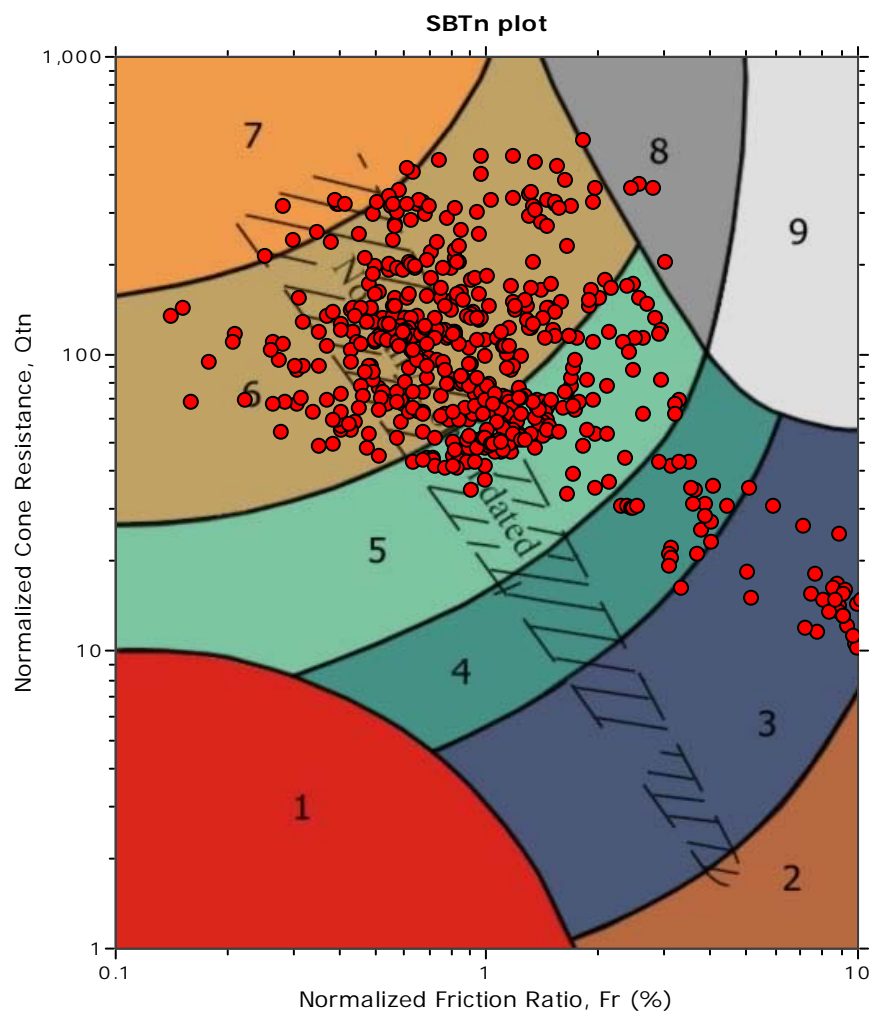
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



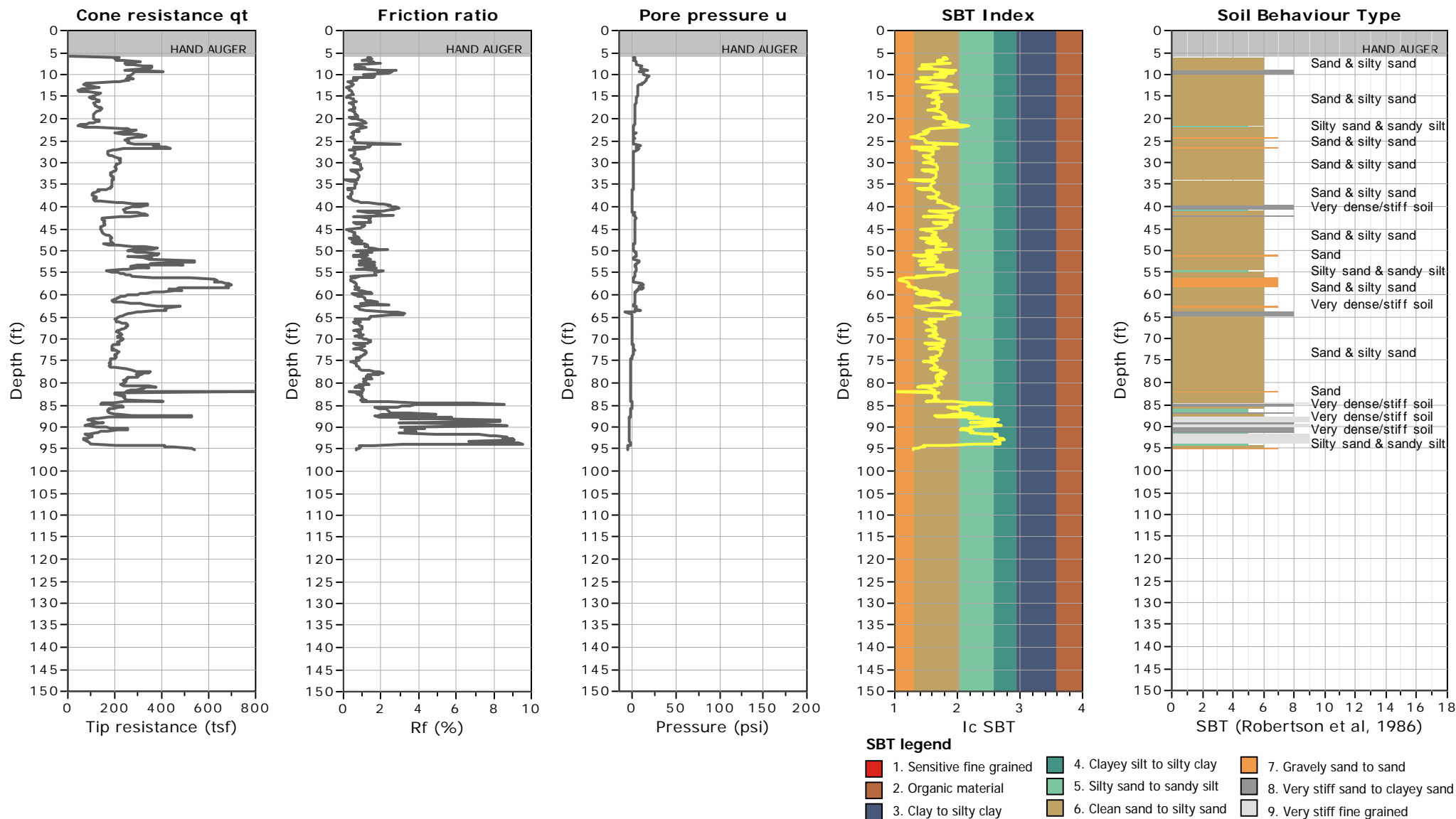


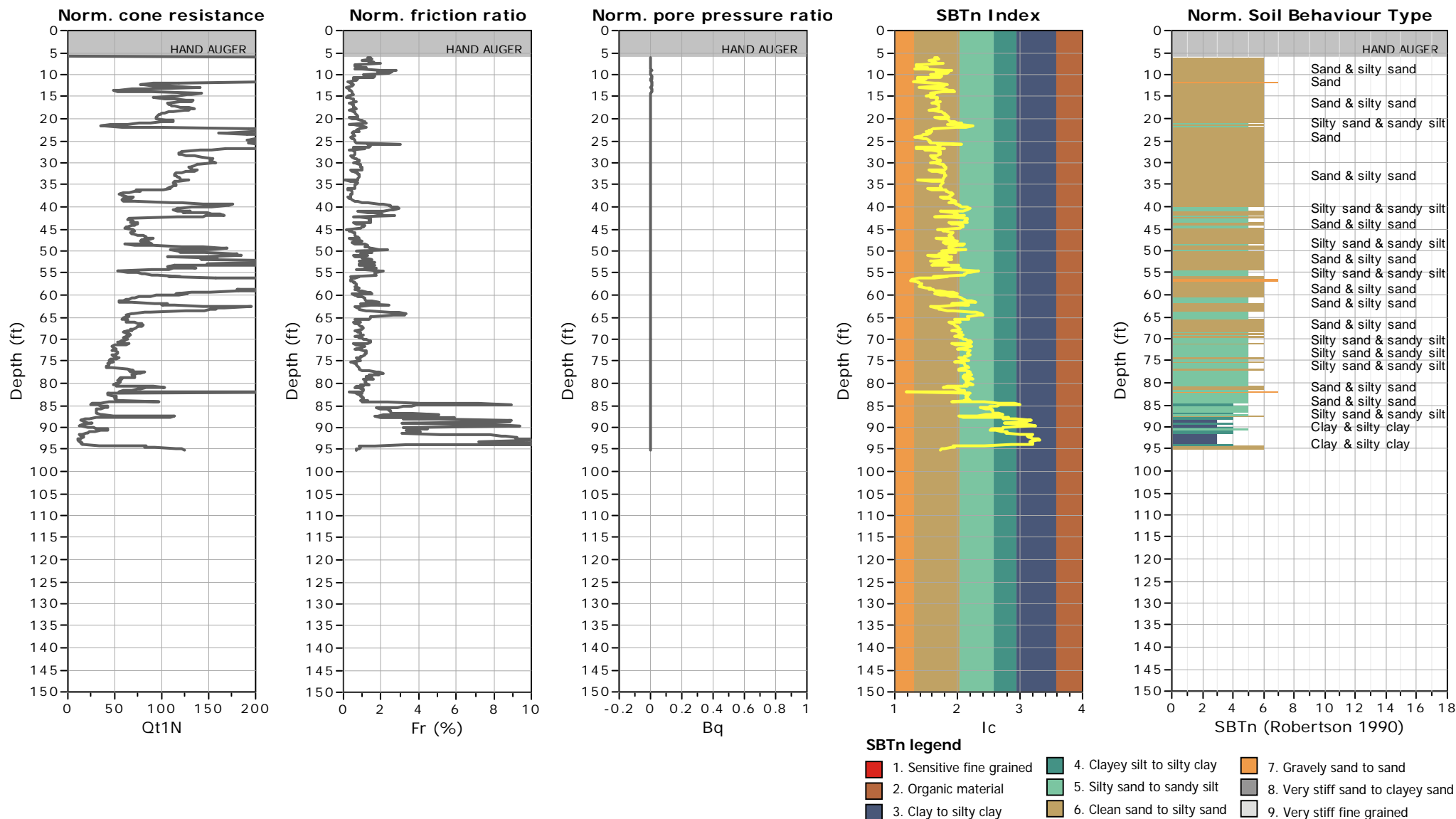
SBT - Bq plots (normalized)



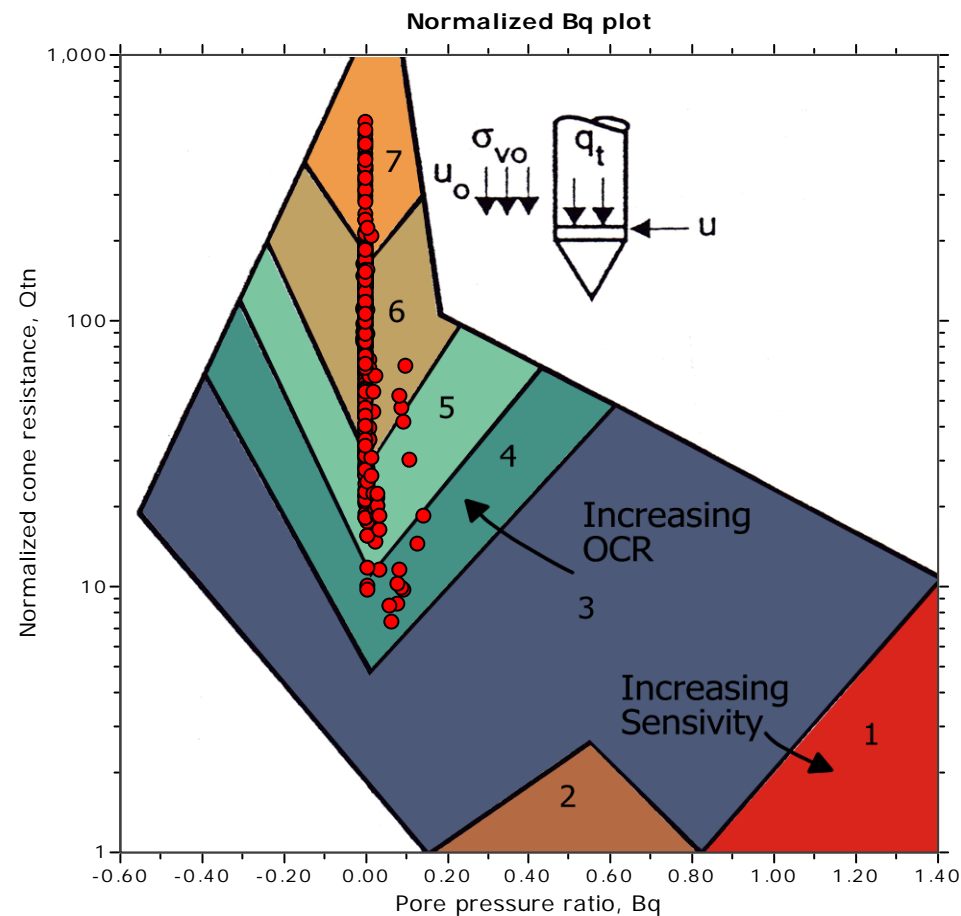
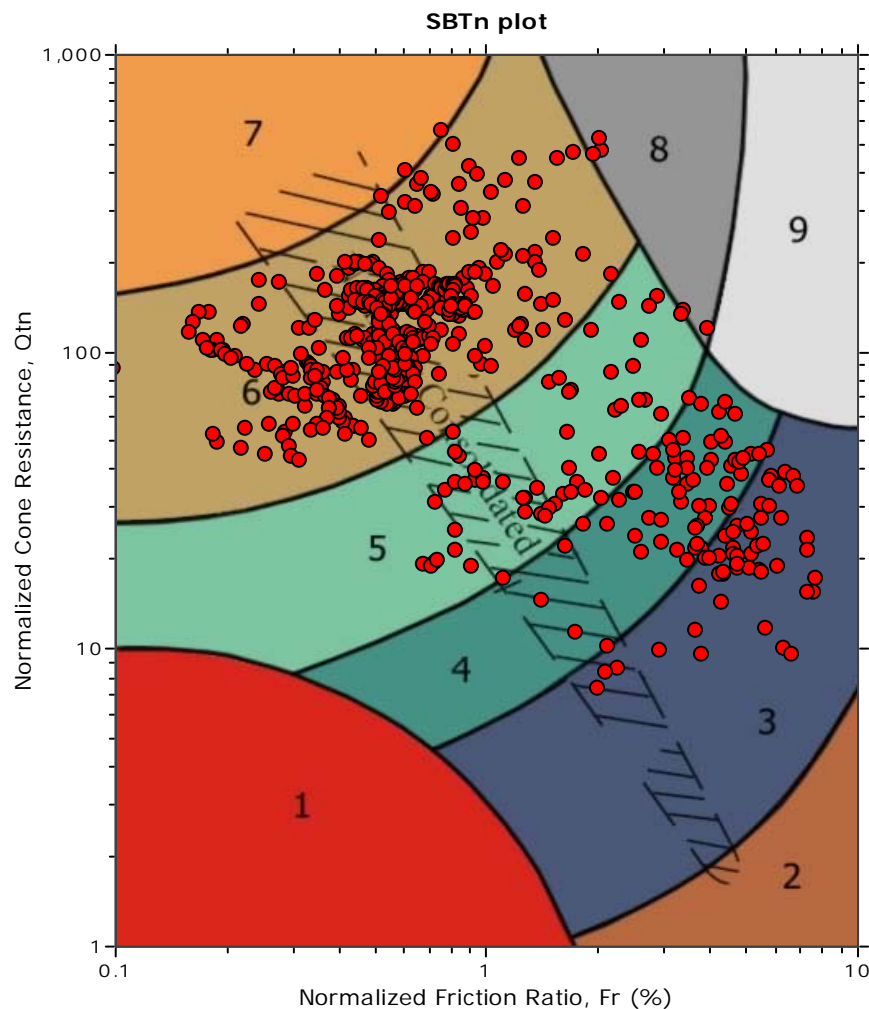
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



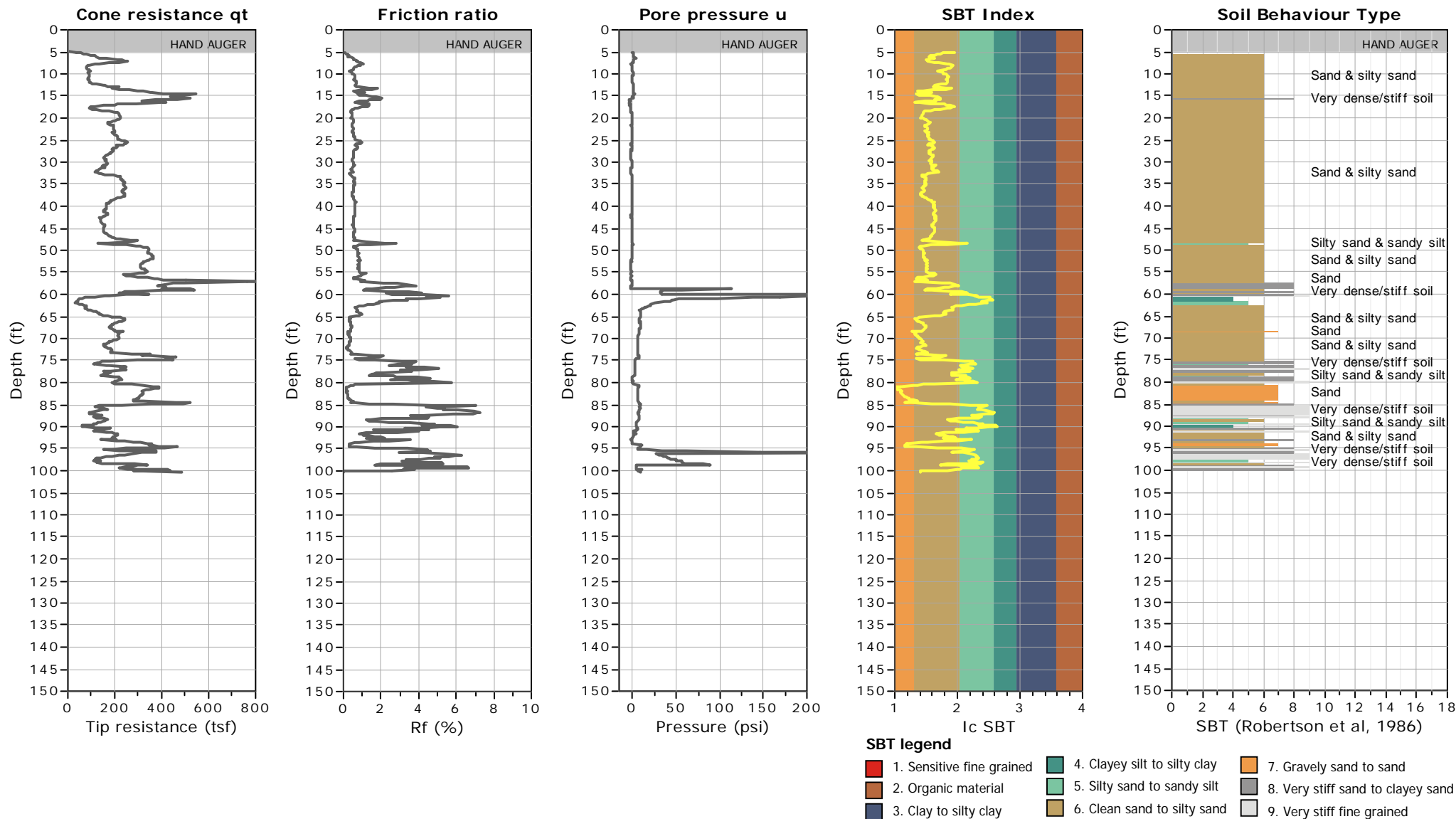


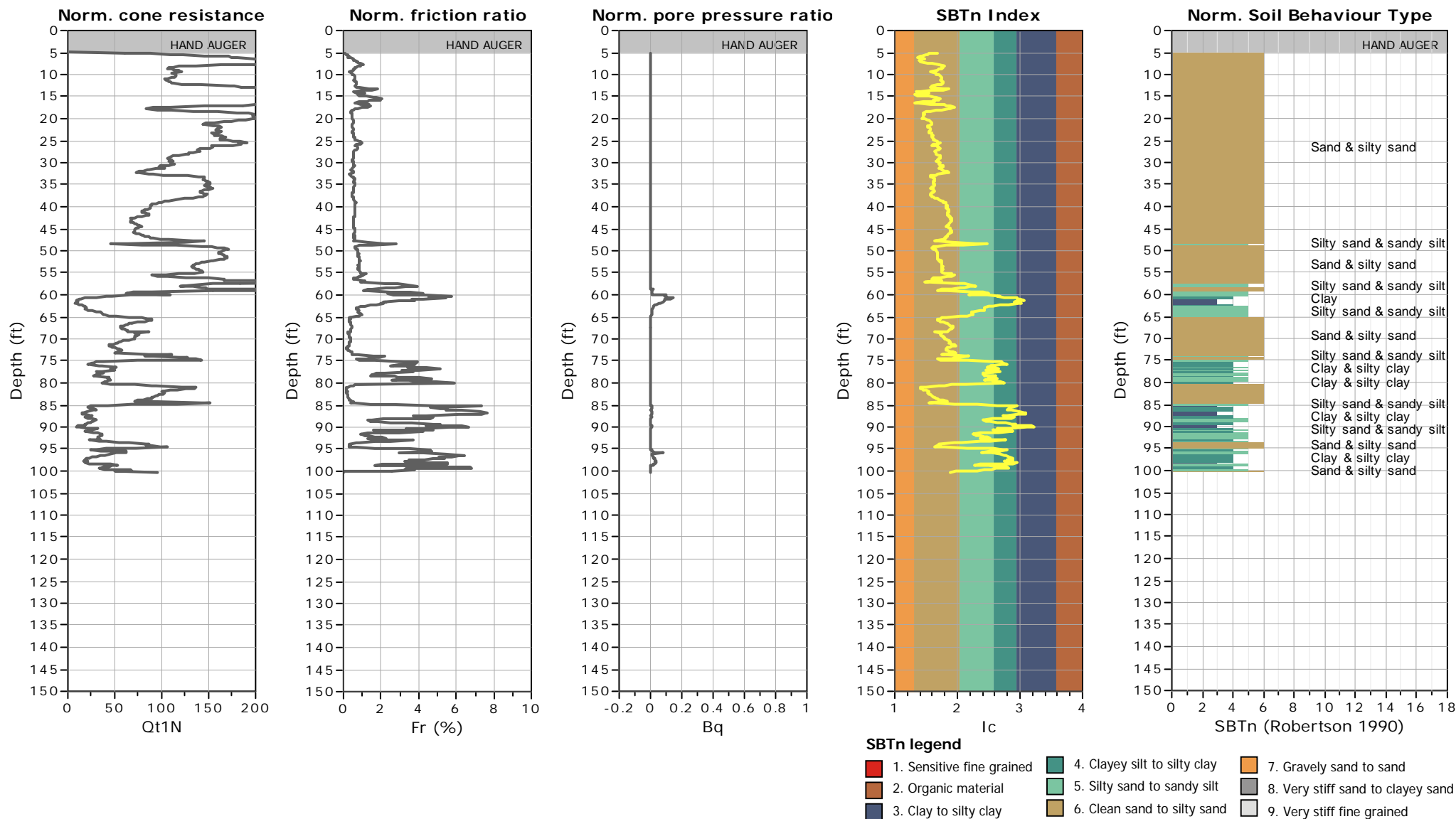
SBT - Bq plots (normalized)



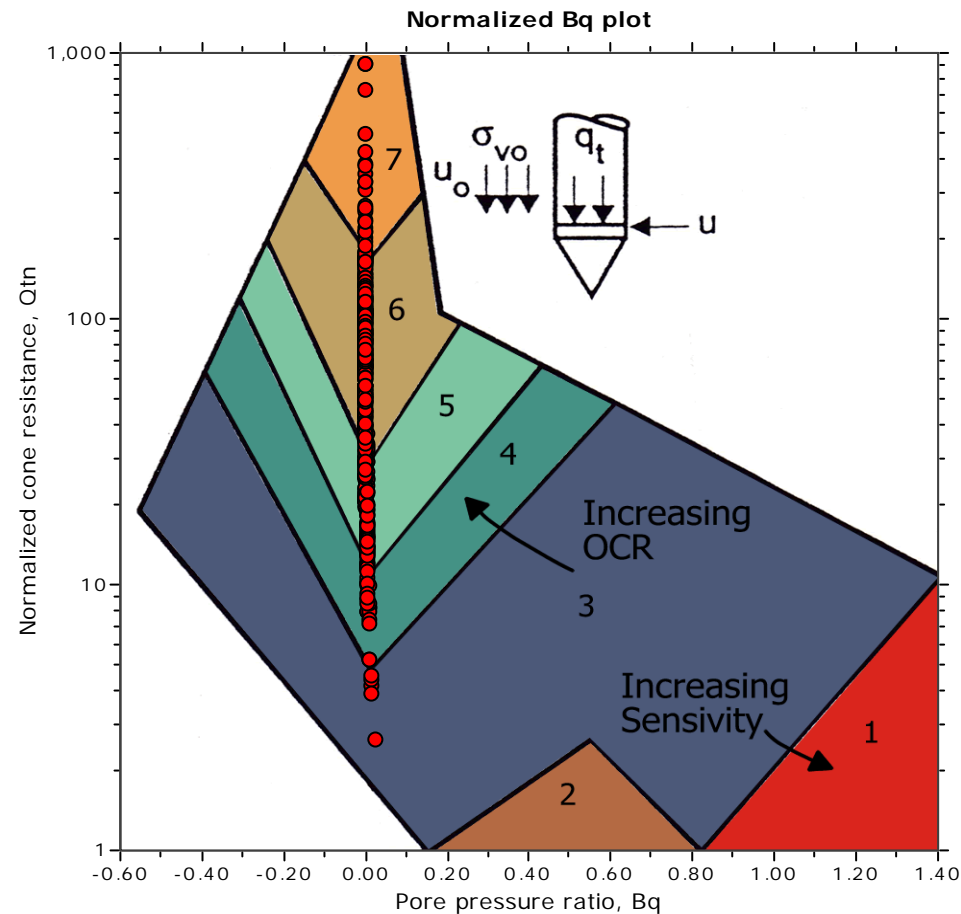
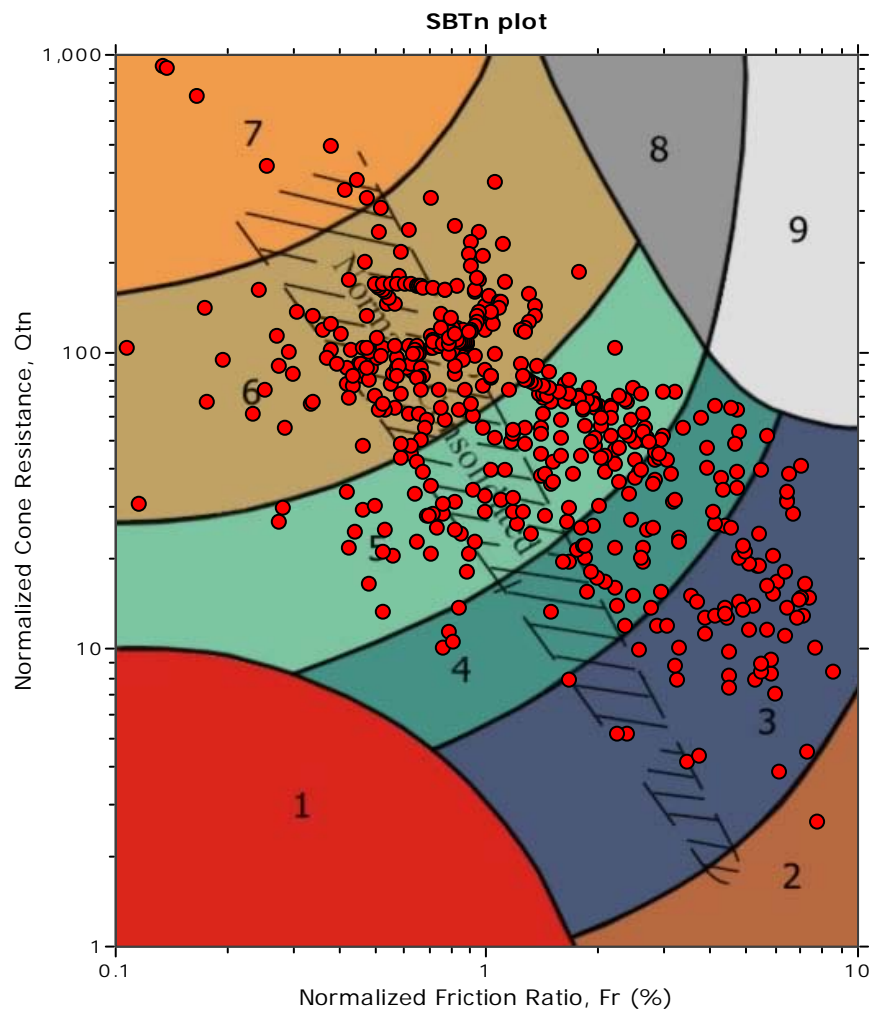
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



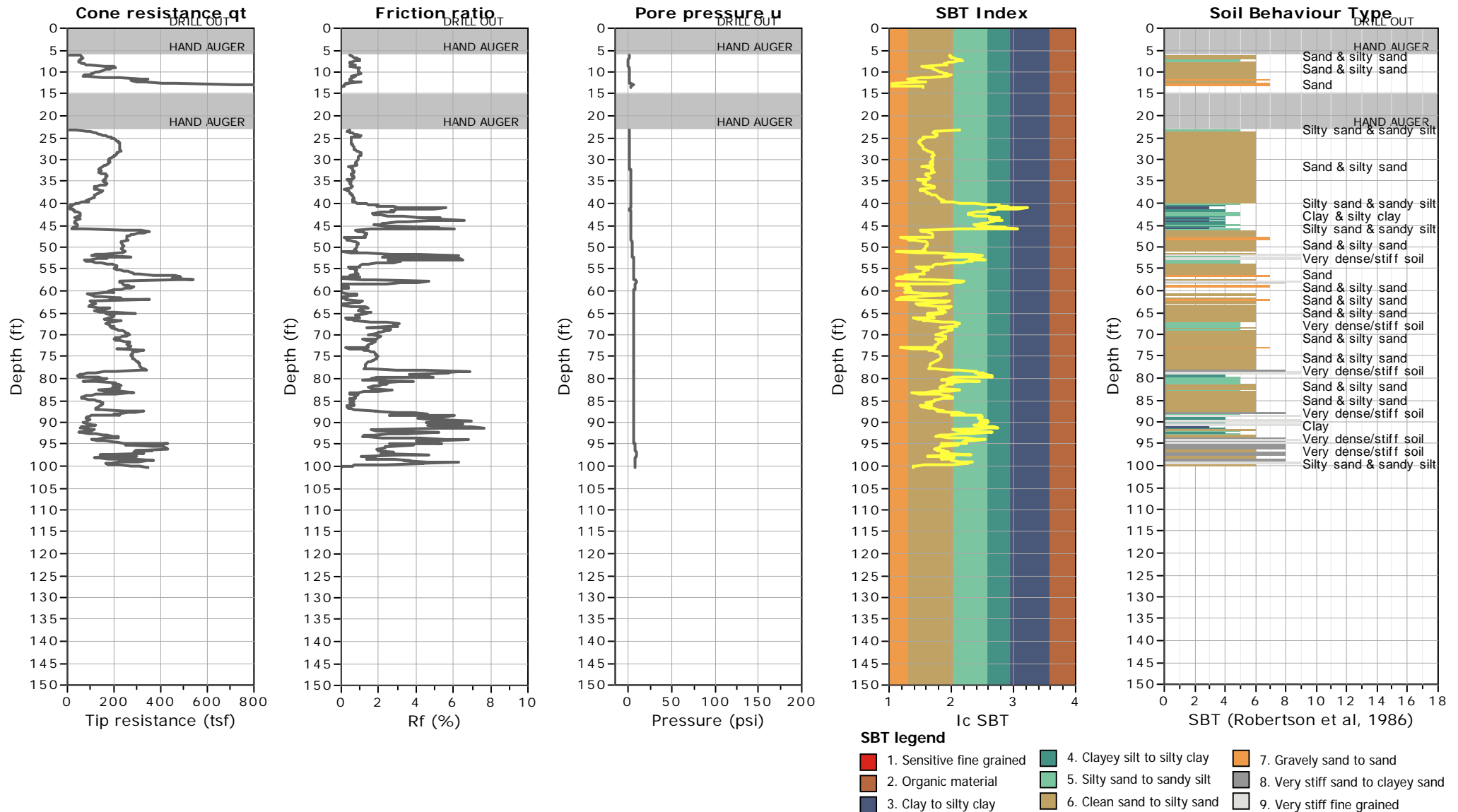


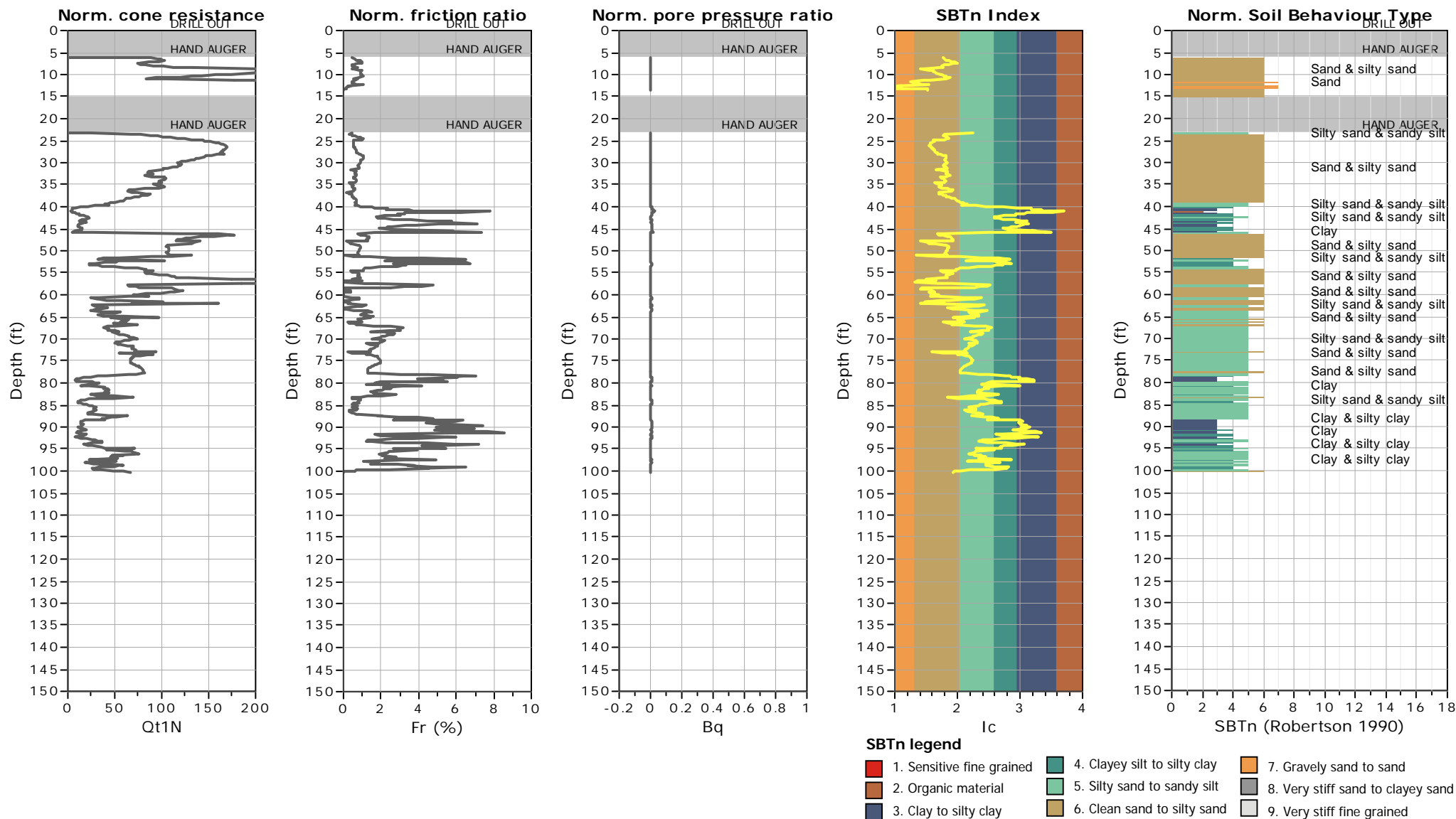
SBT - Bq plots (normalized)



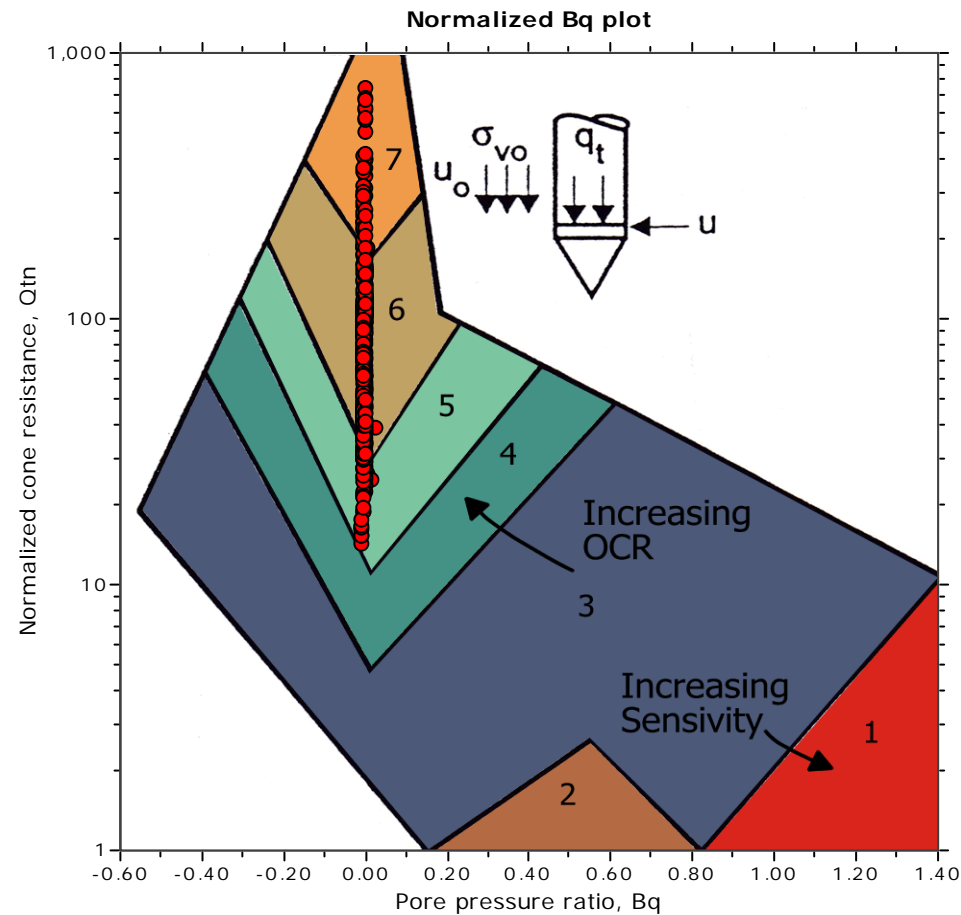
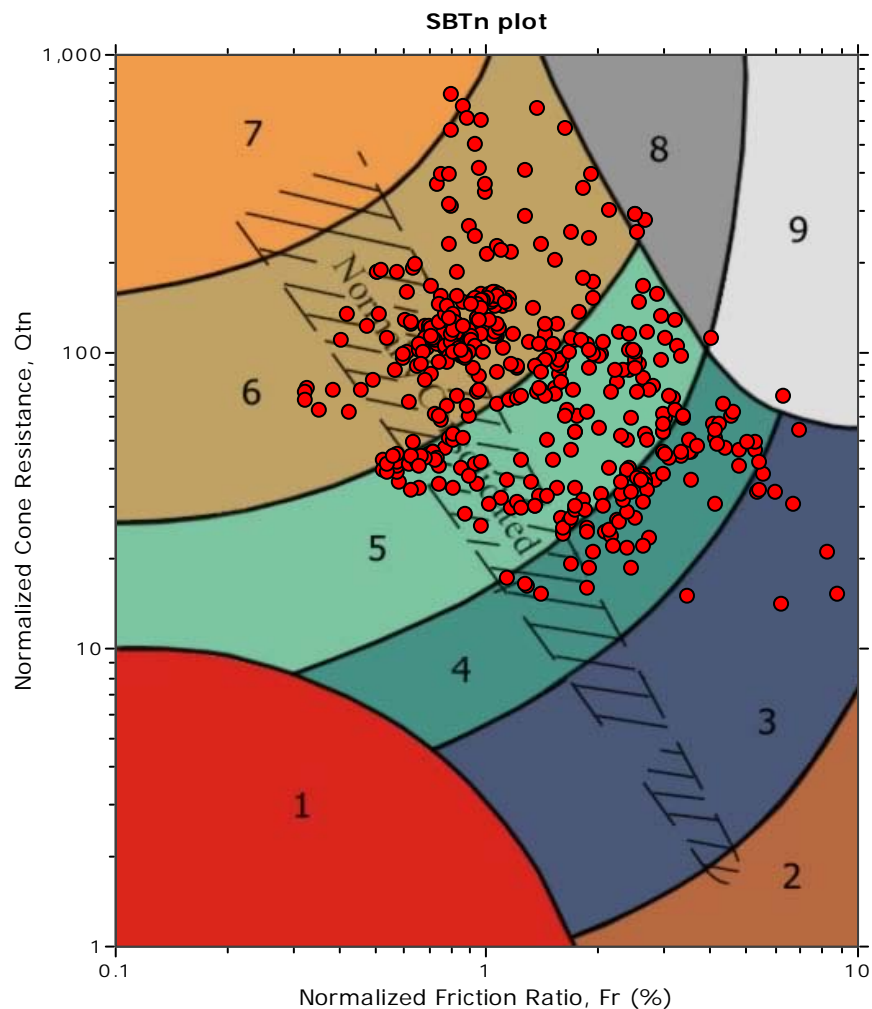
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



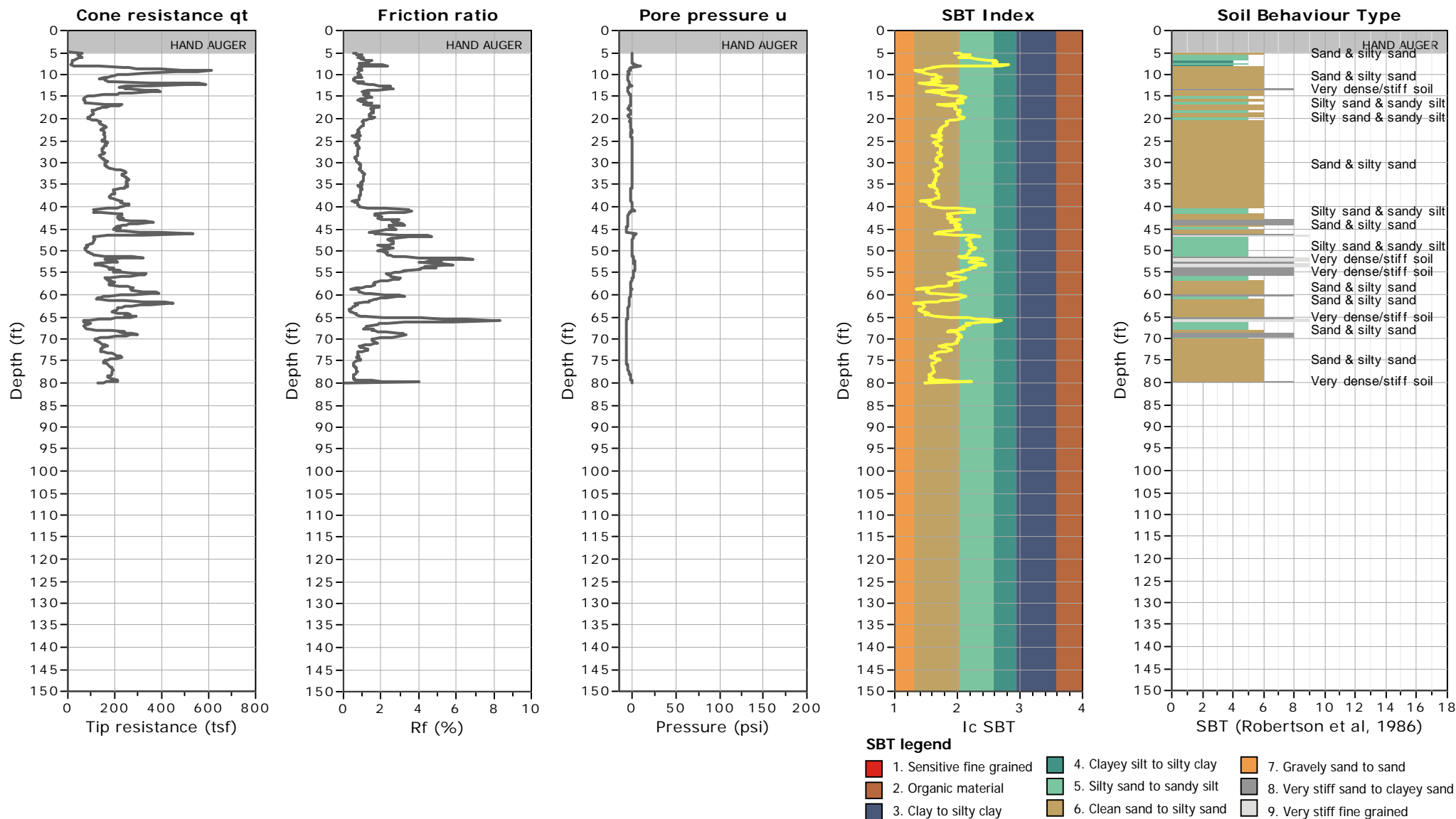


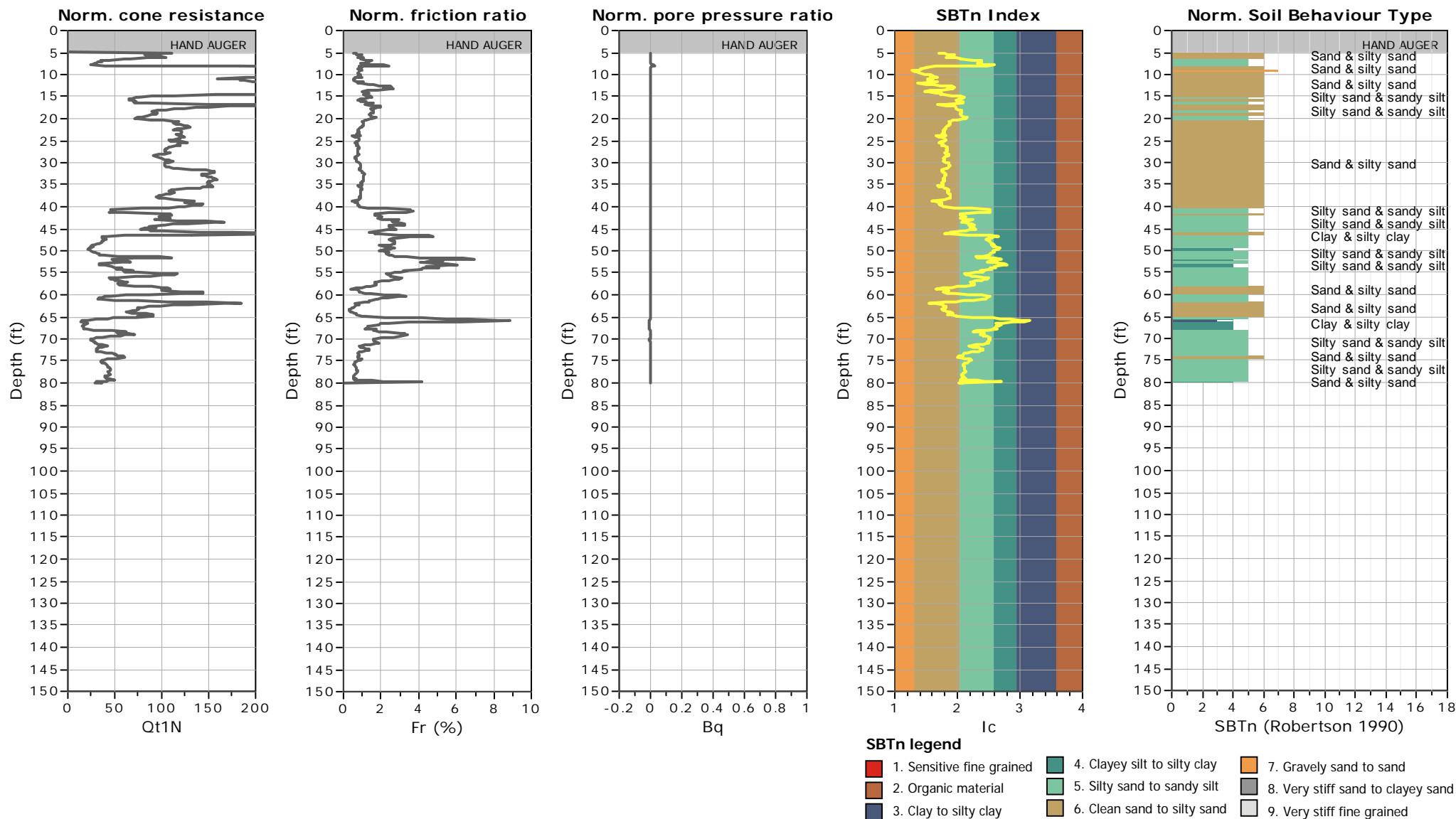
SBT - Bq plots (normalized)



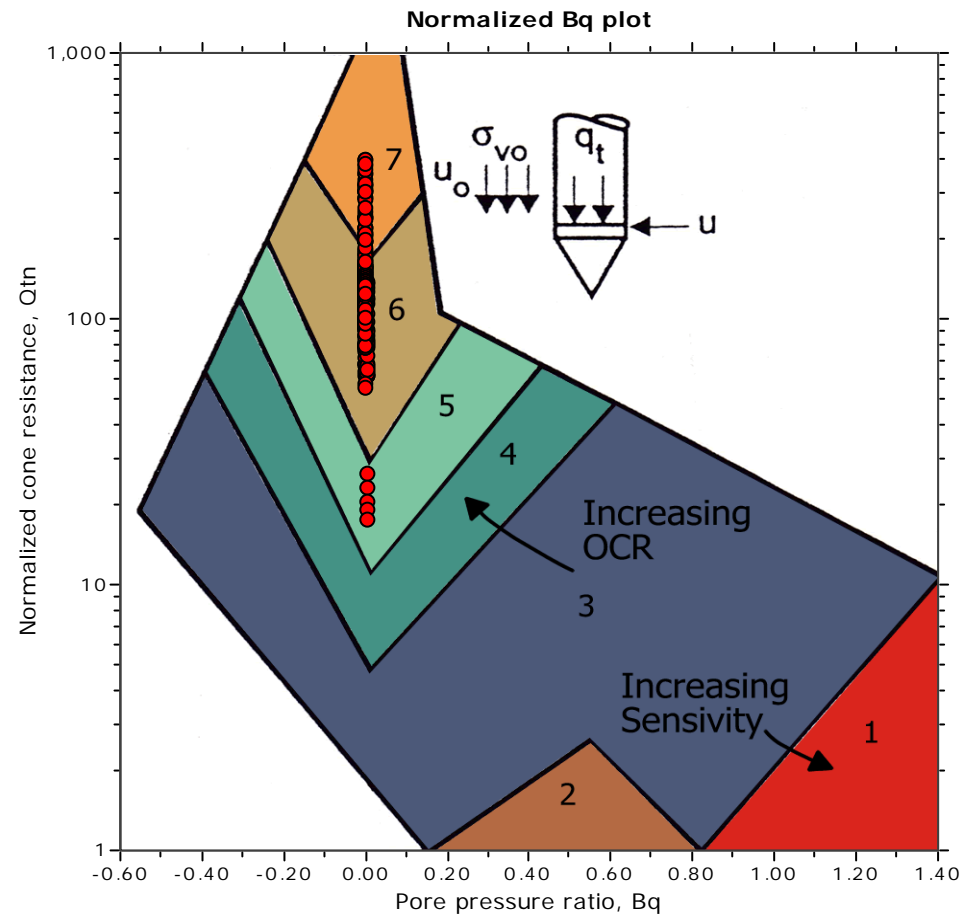
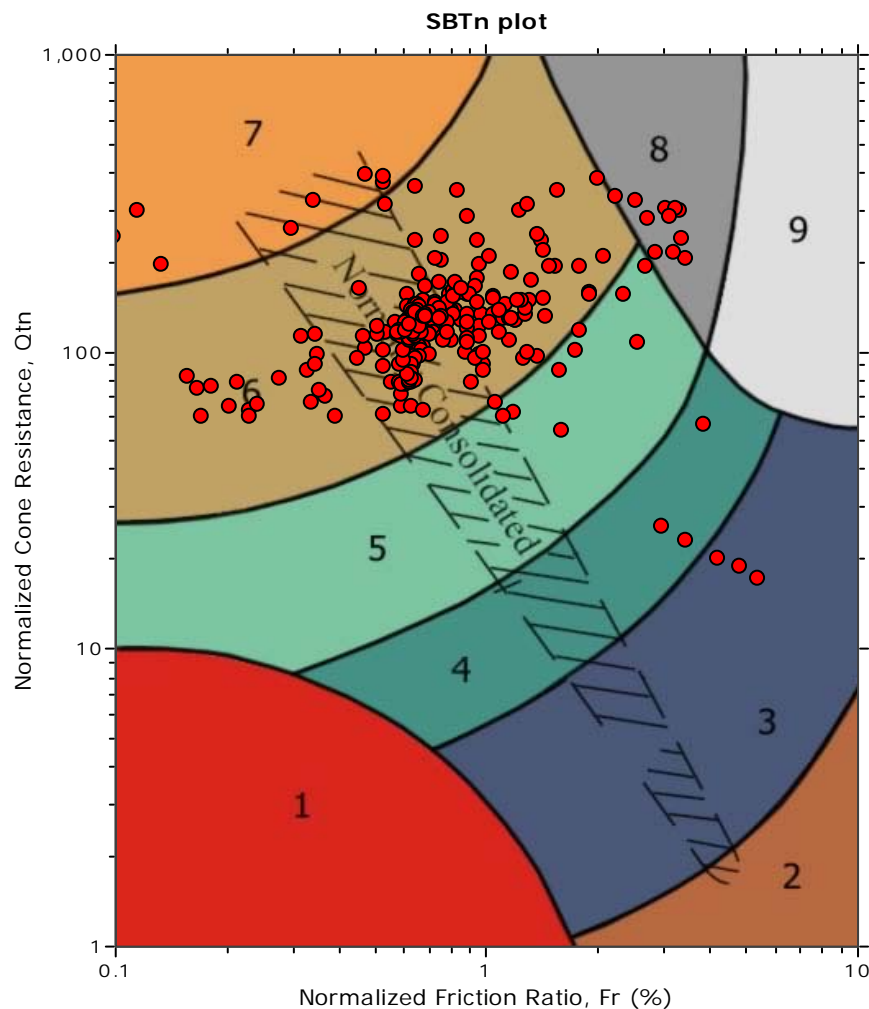
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



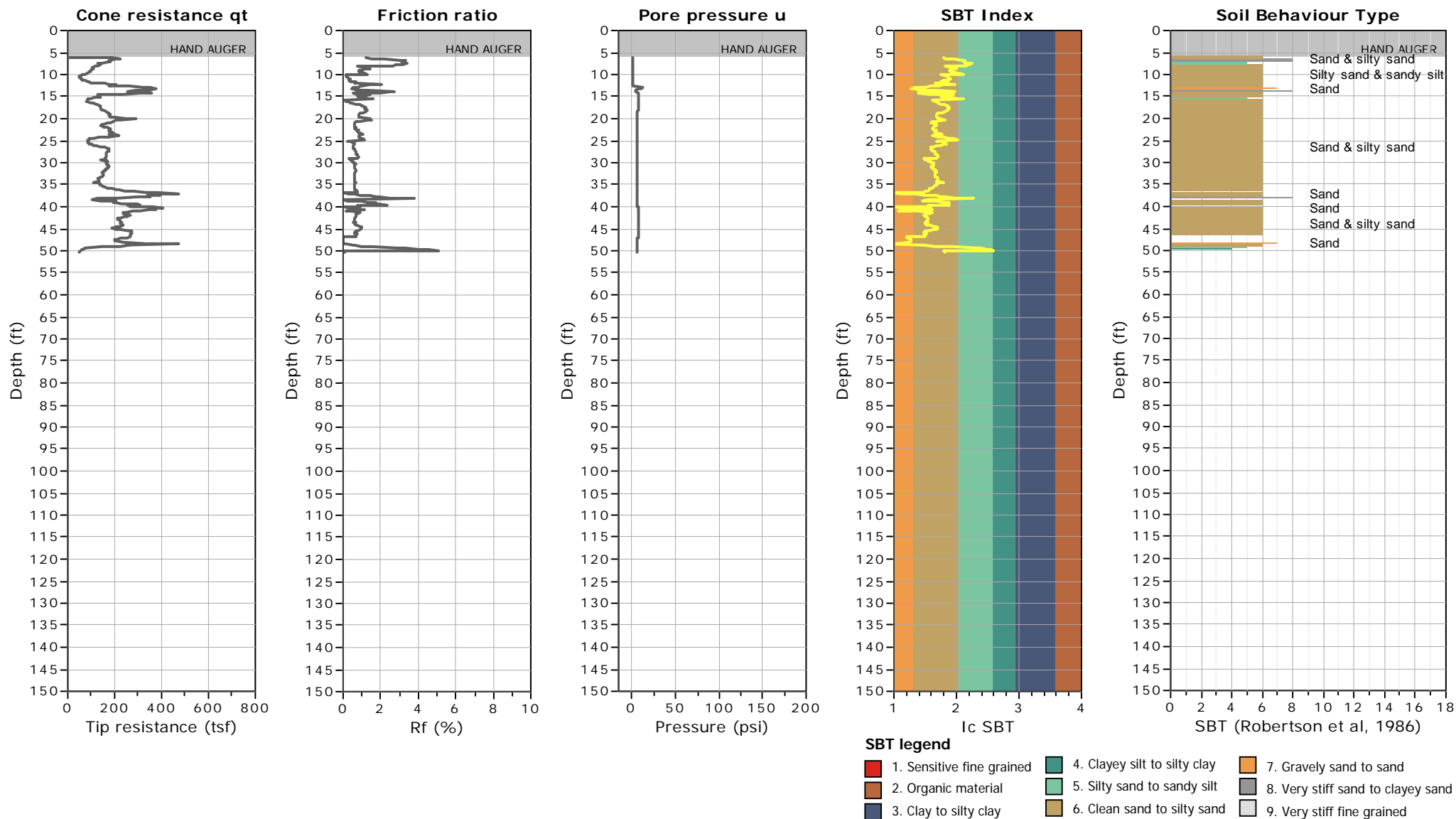


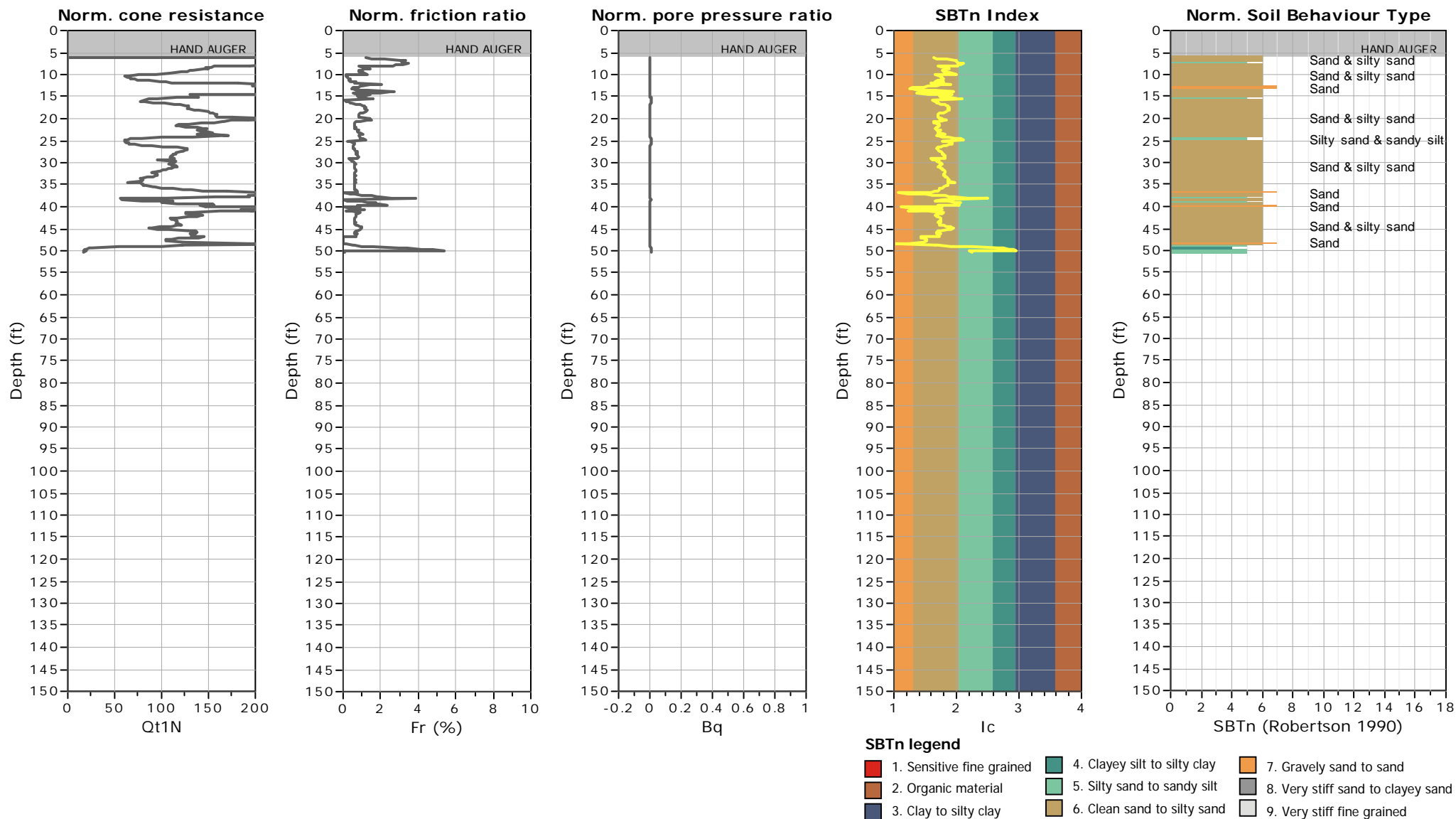
SBT - Bq plots (normalized)



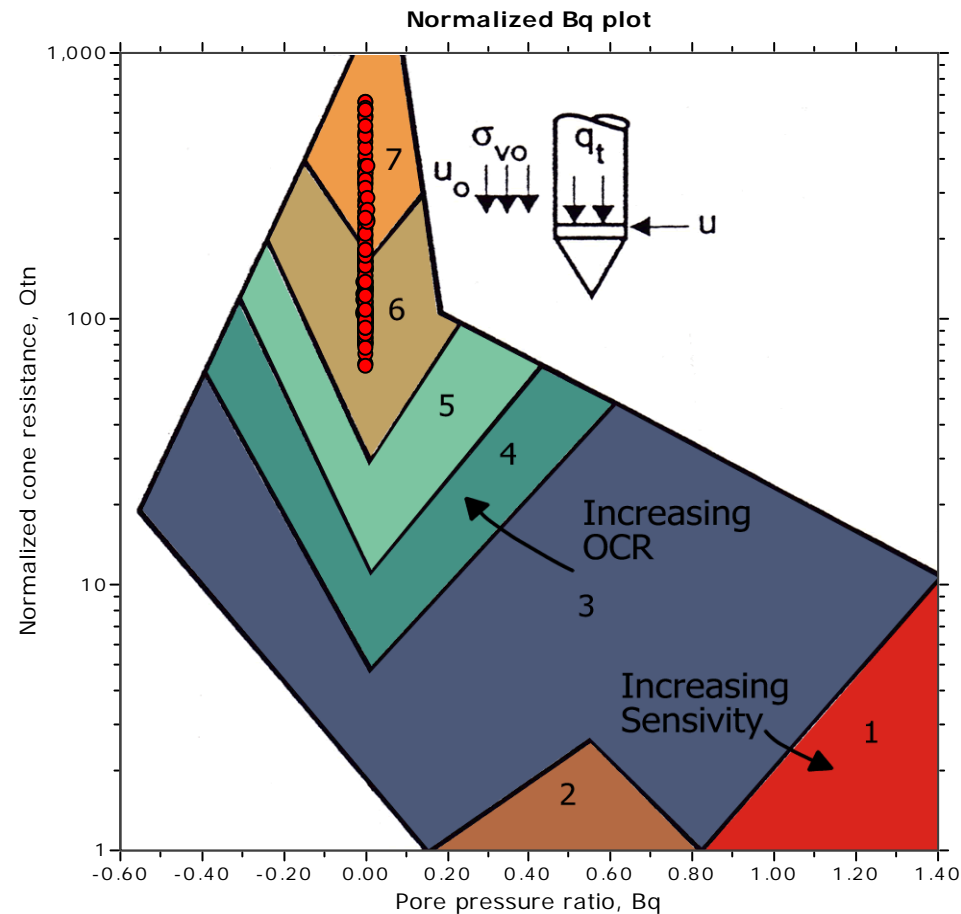
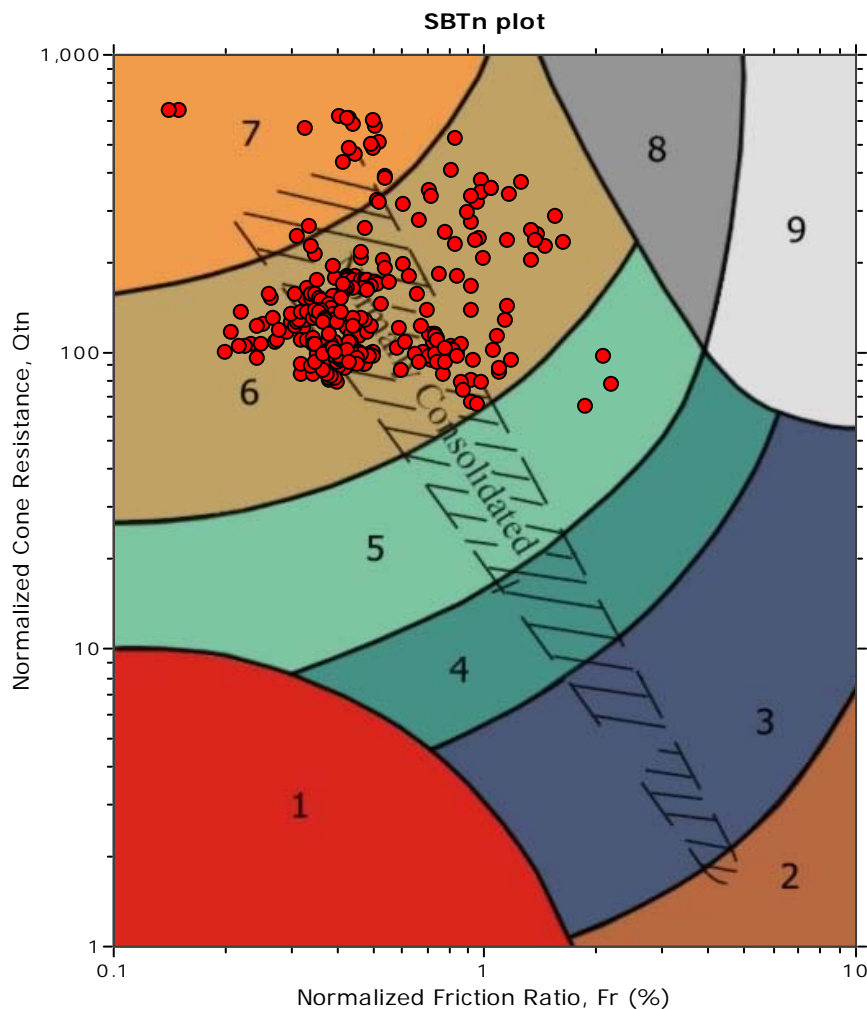
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



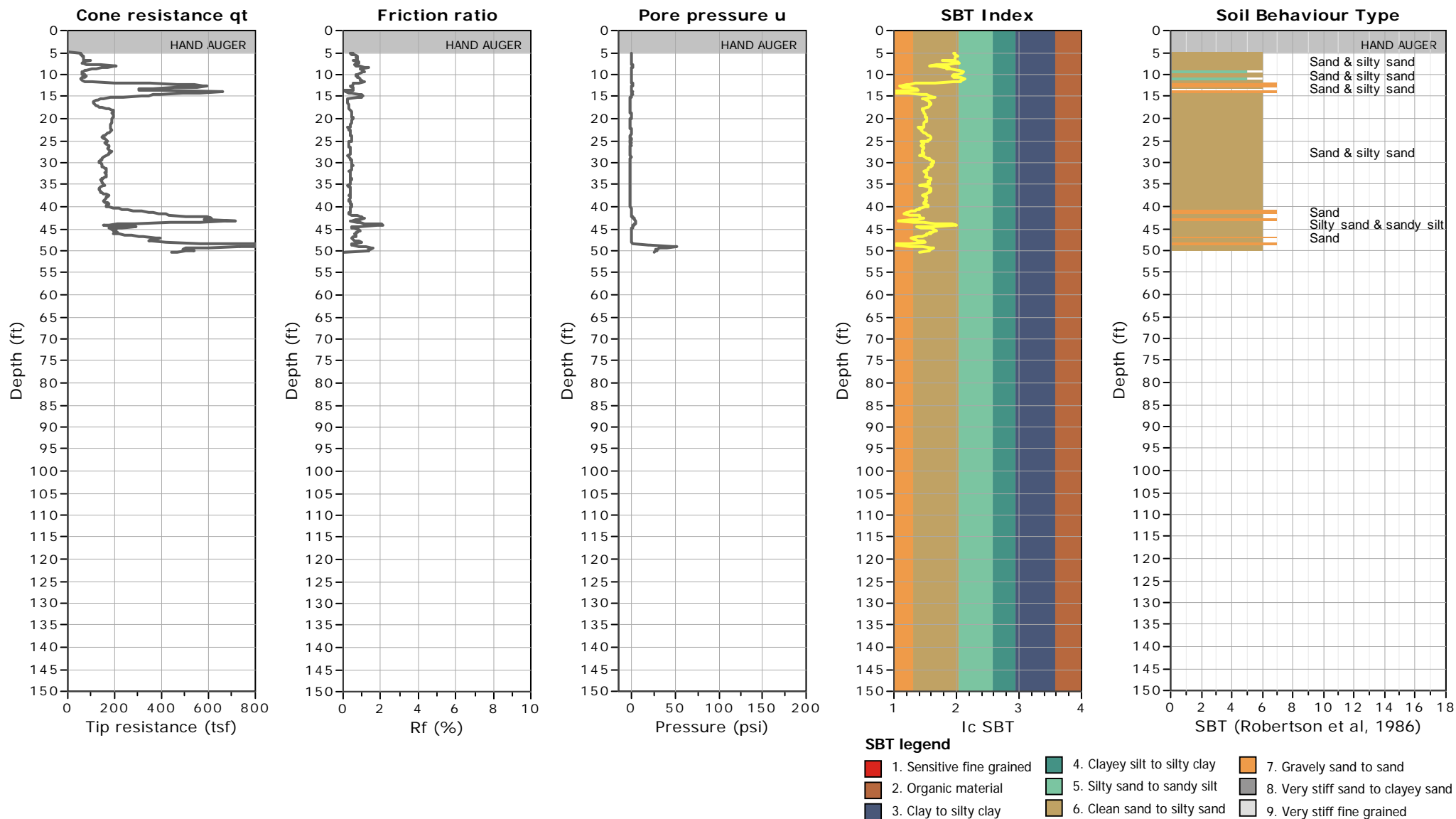


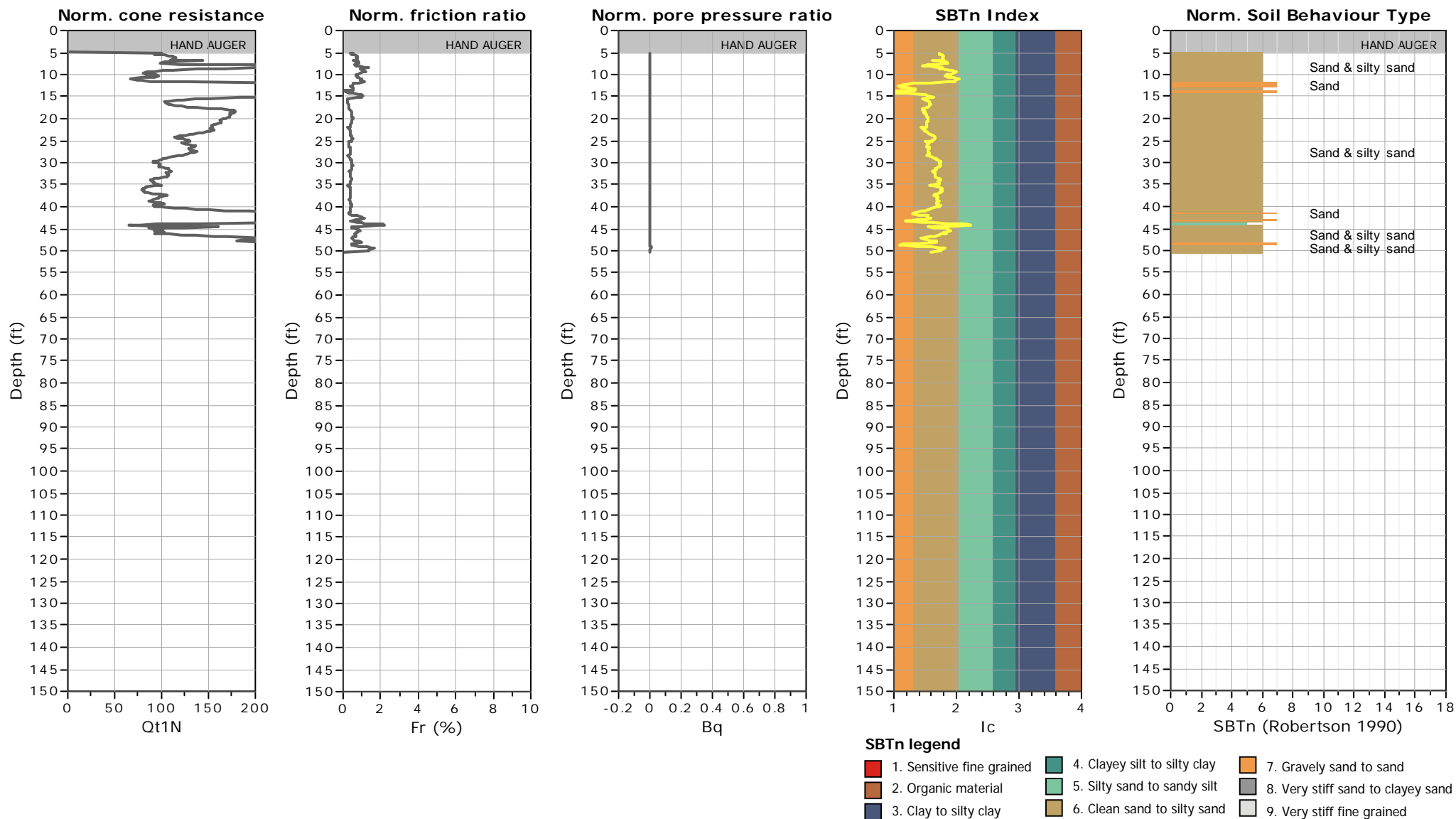
SBT - Bq plots (normalized)



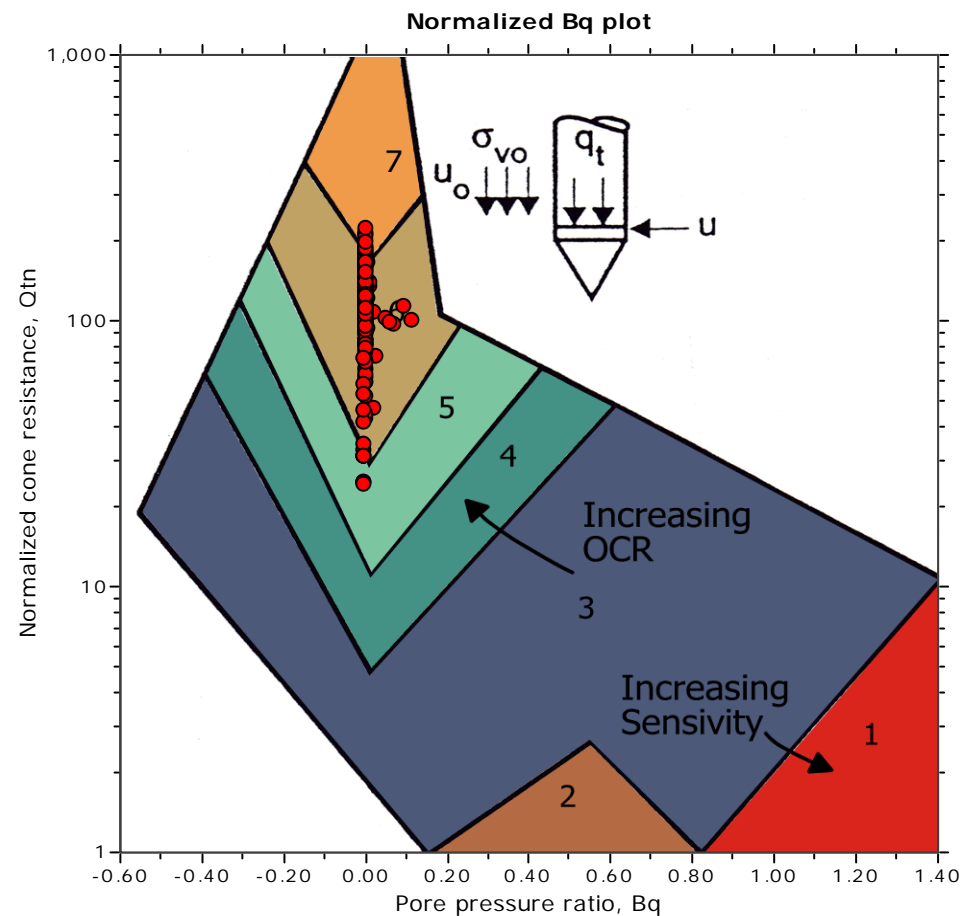
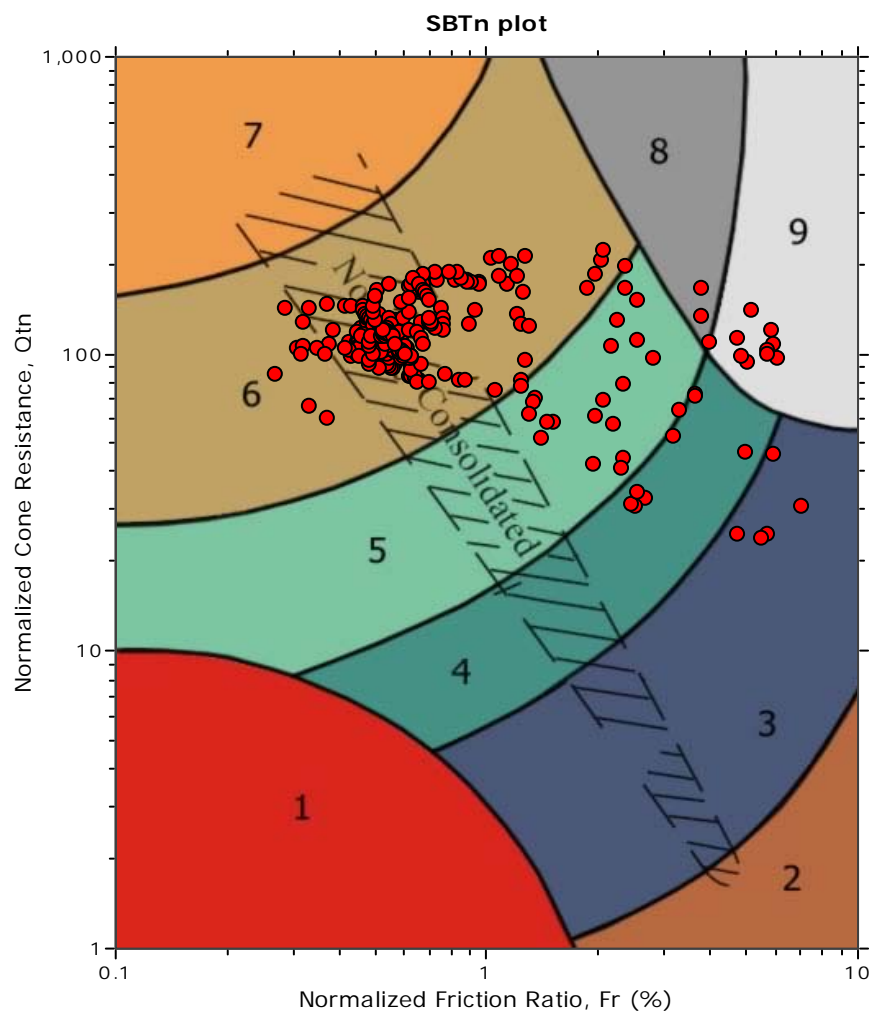
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



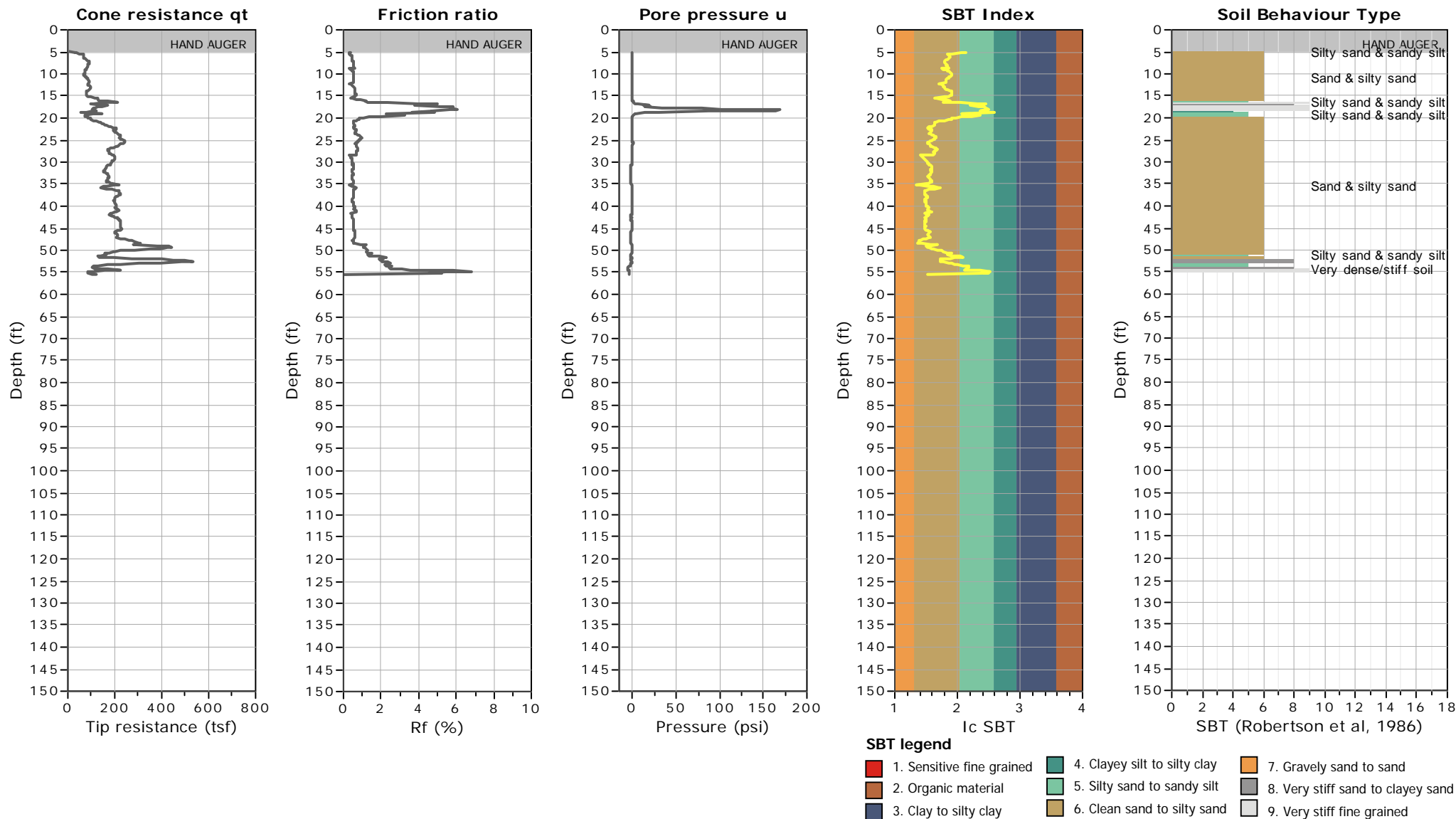


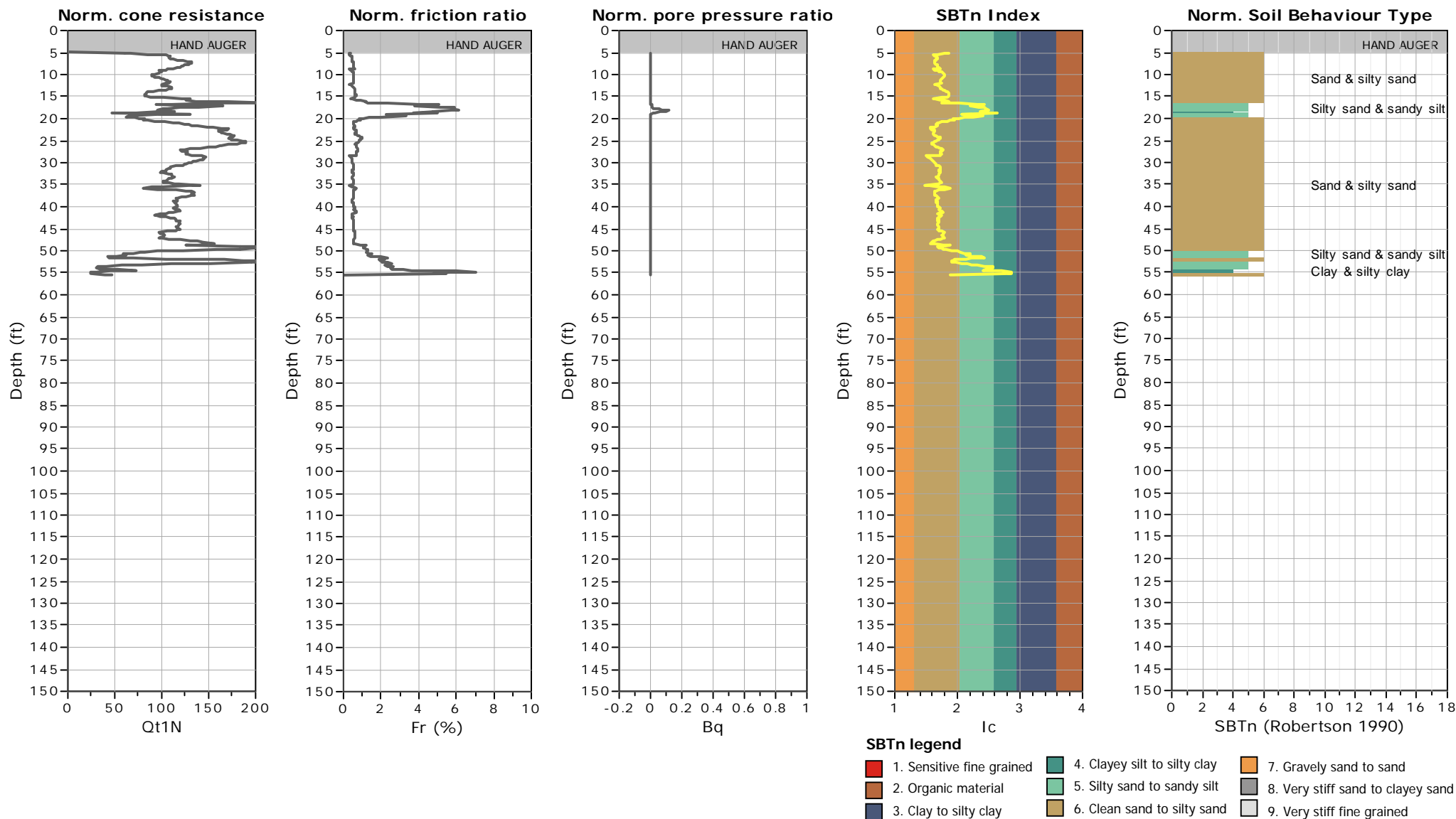
SBT - Bq plots (normalized)



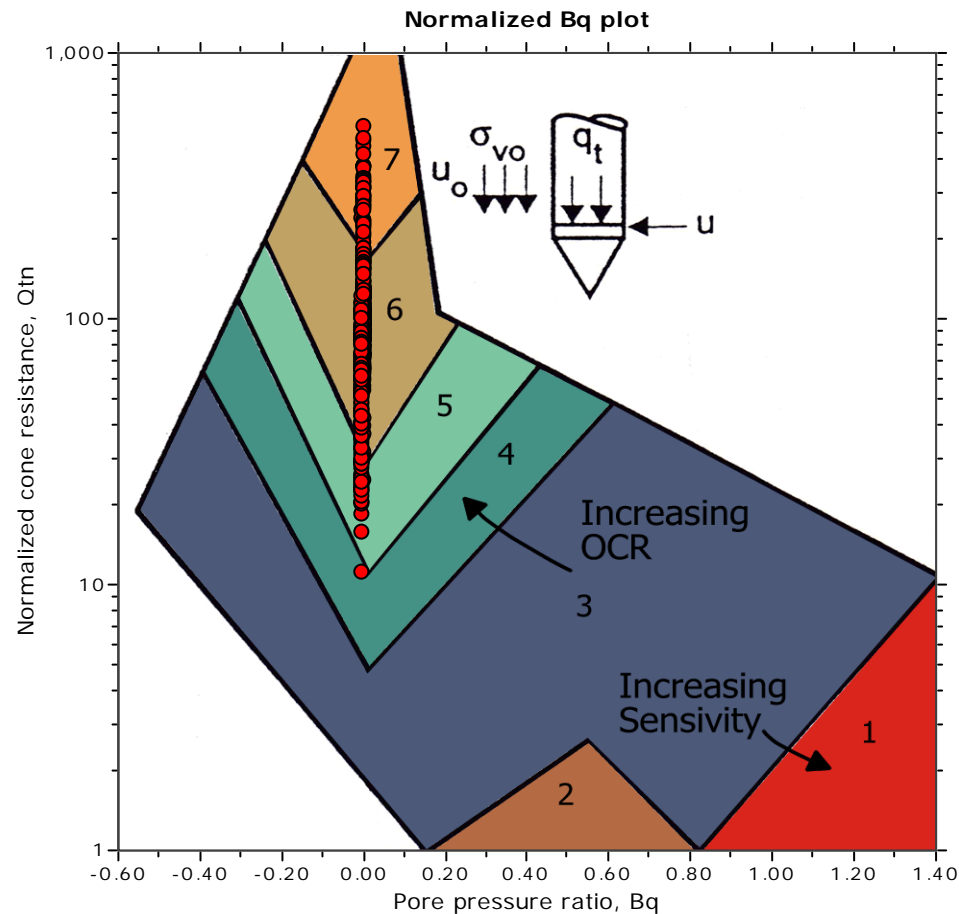
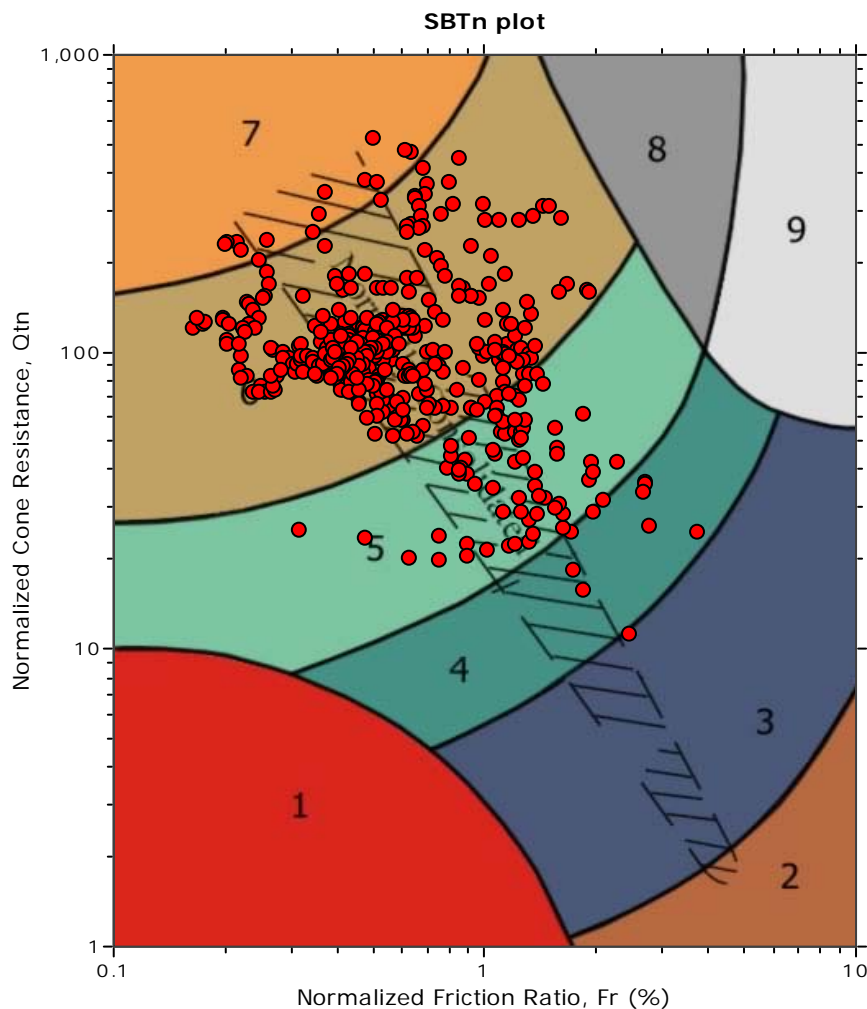
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



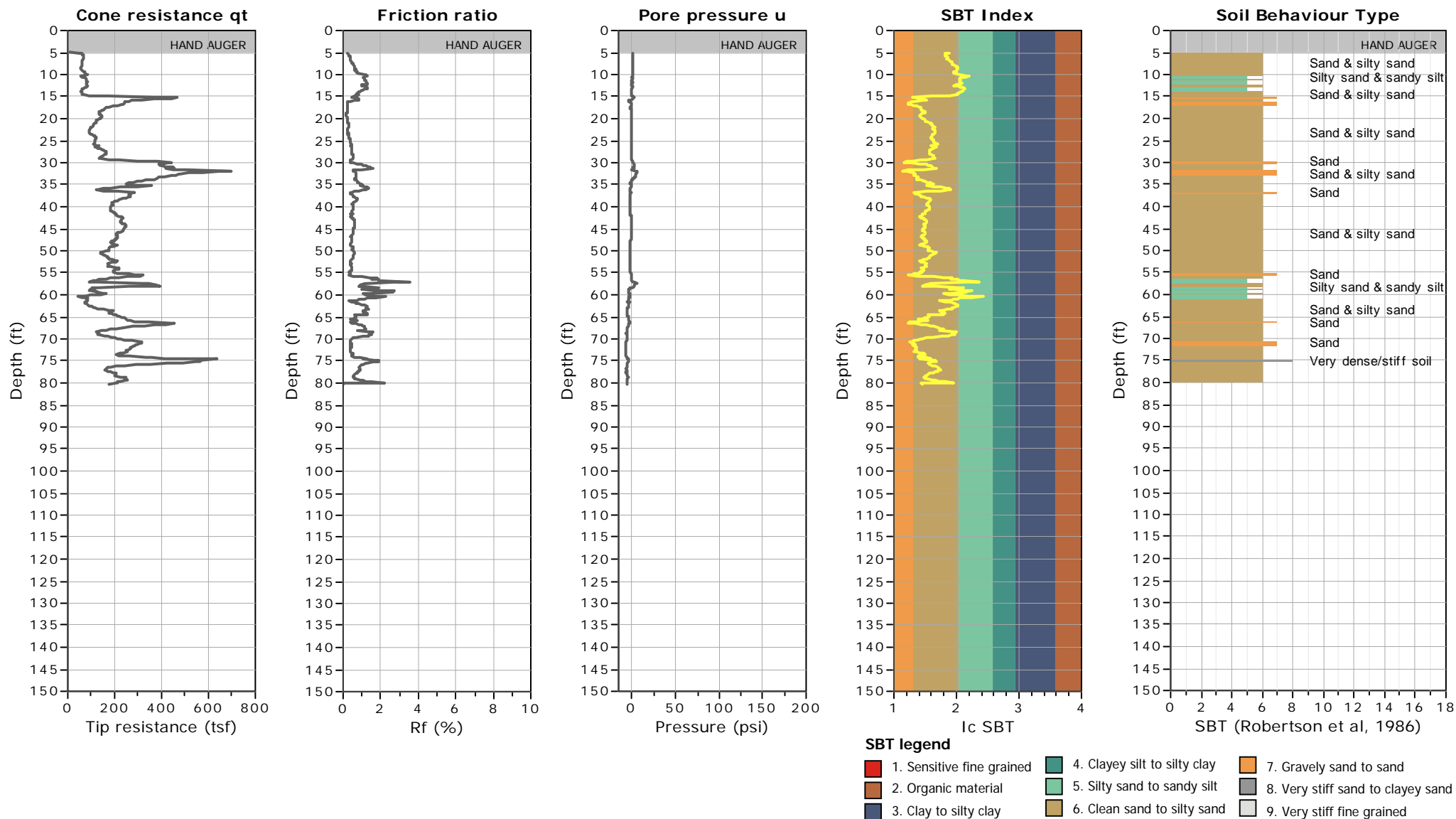


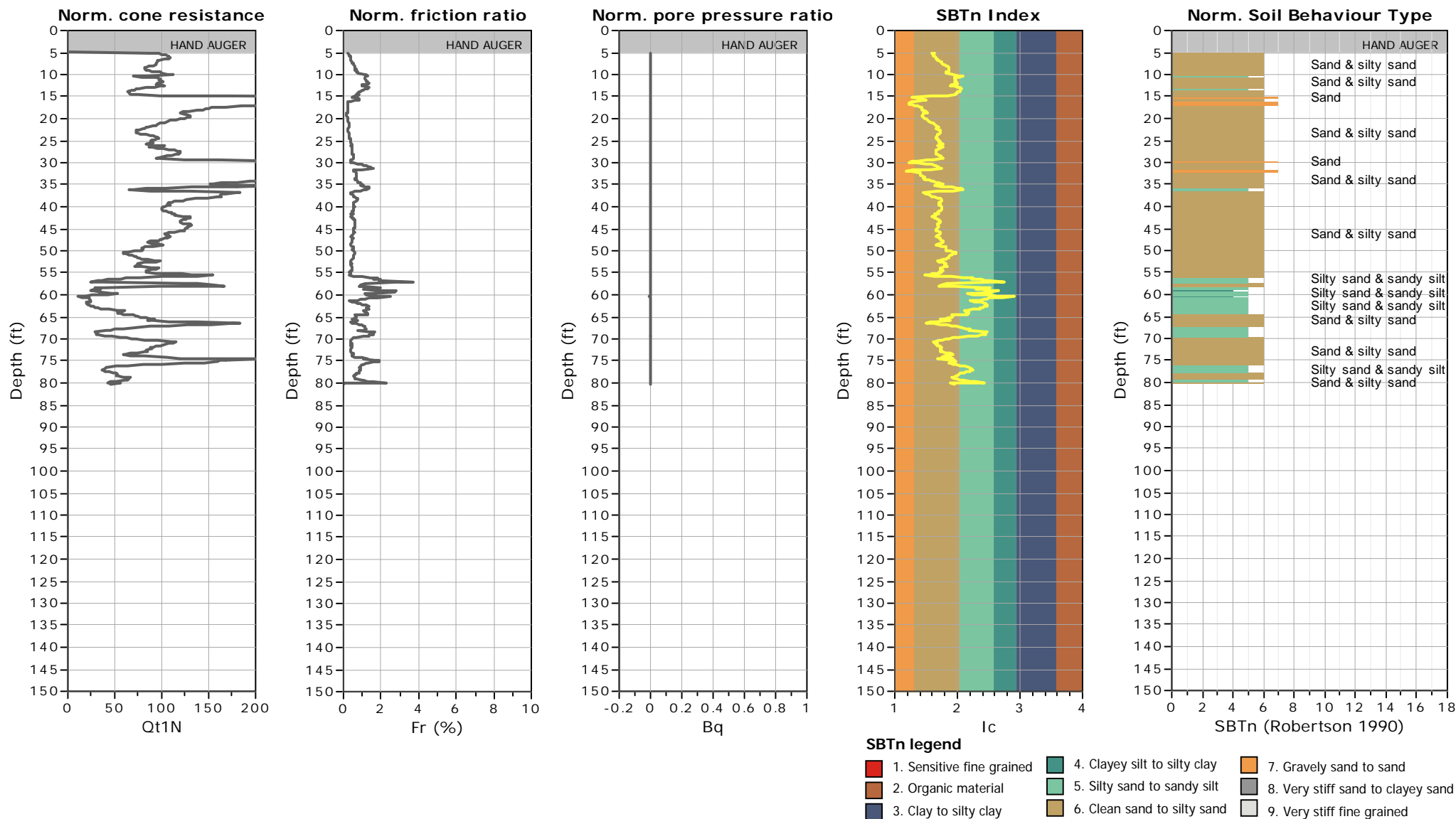
SBT - Bq plots (normalized)



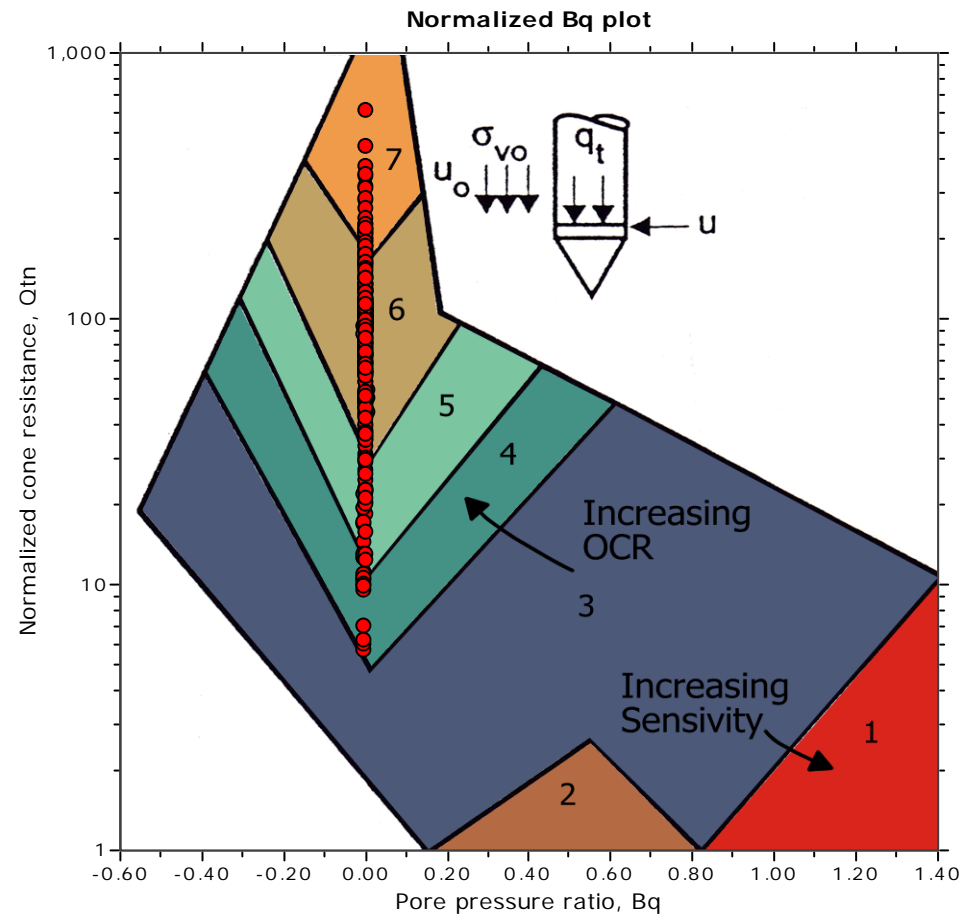
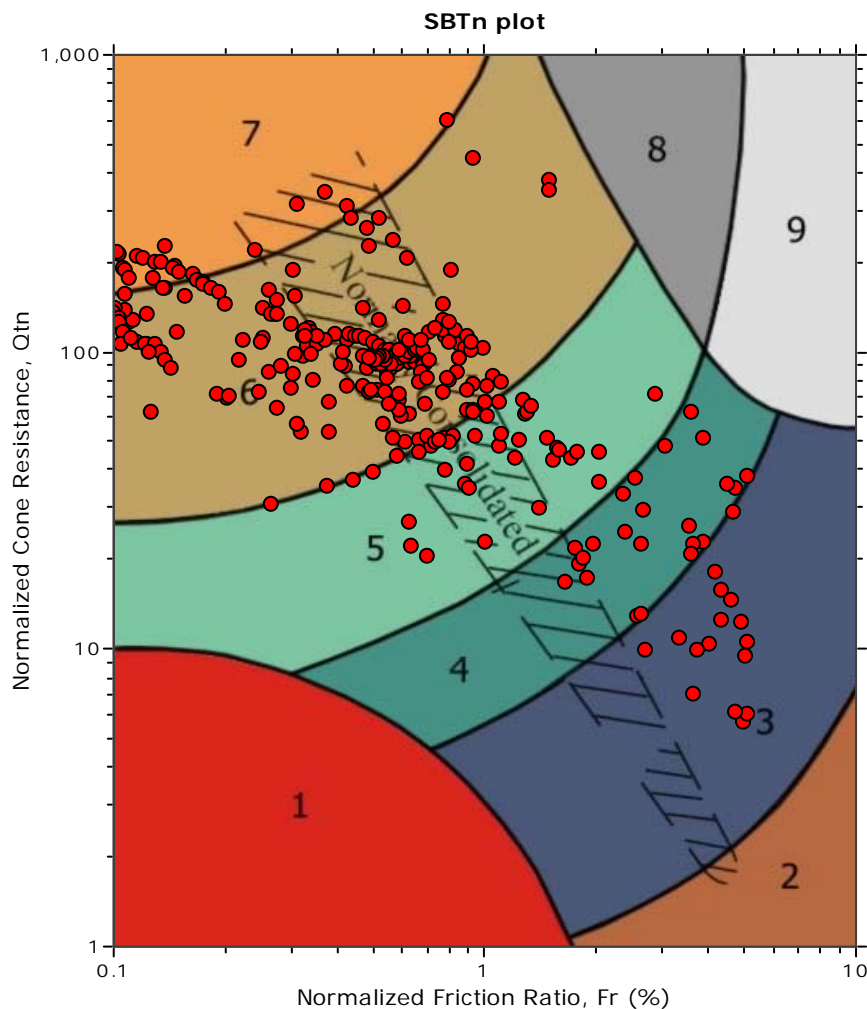
SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



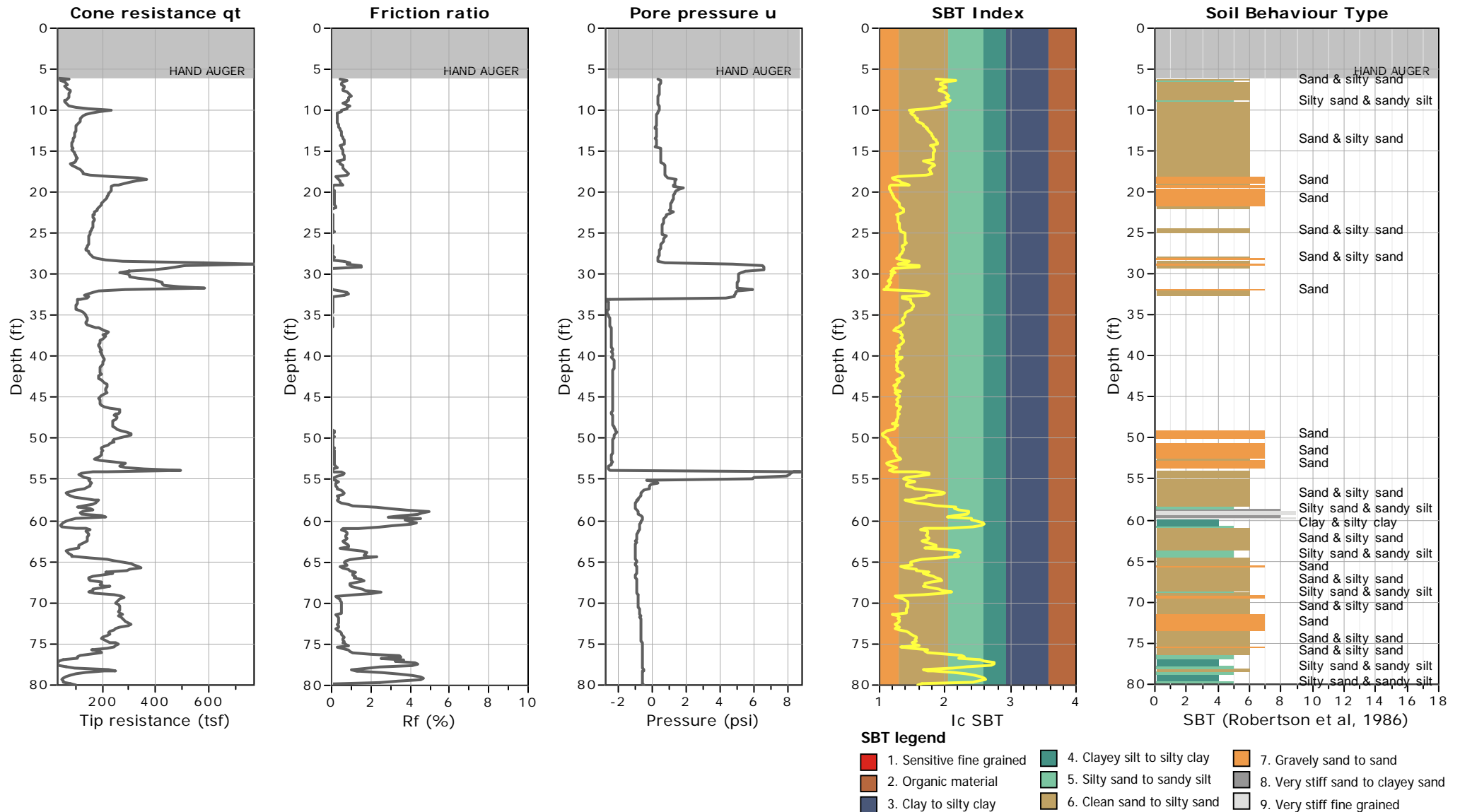


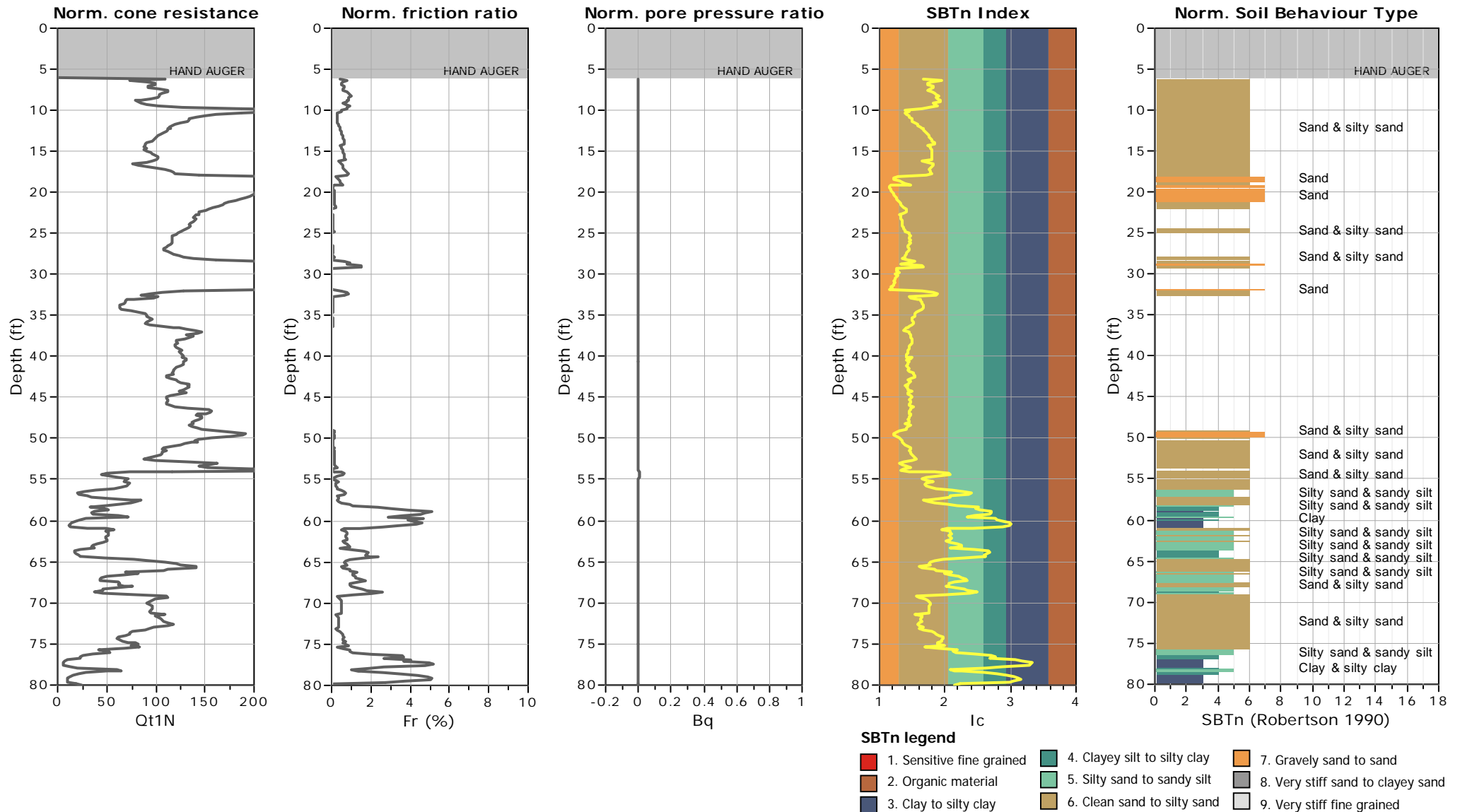
SBT - Bq plots (normalized)



SBTn legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |



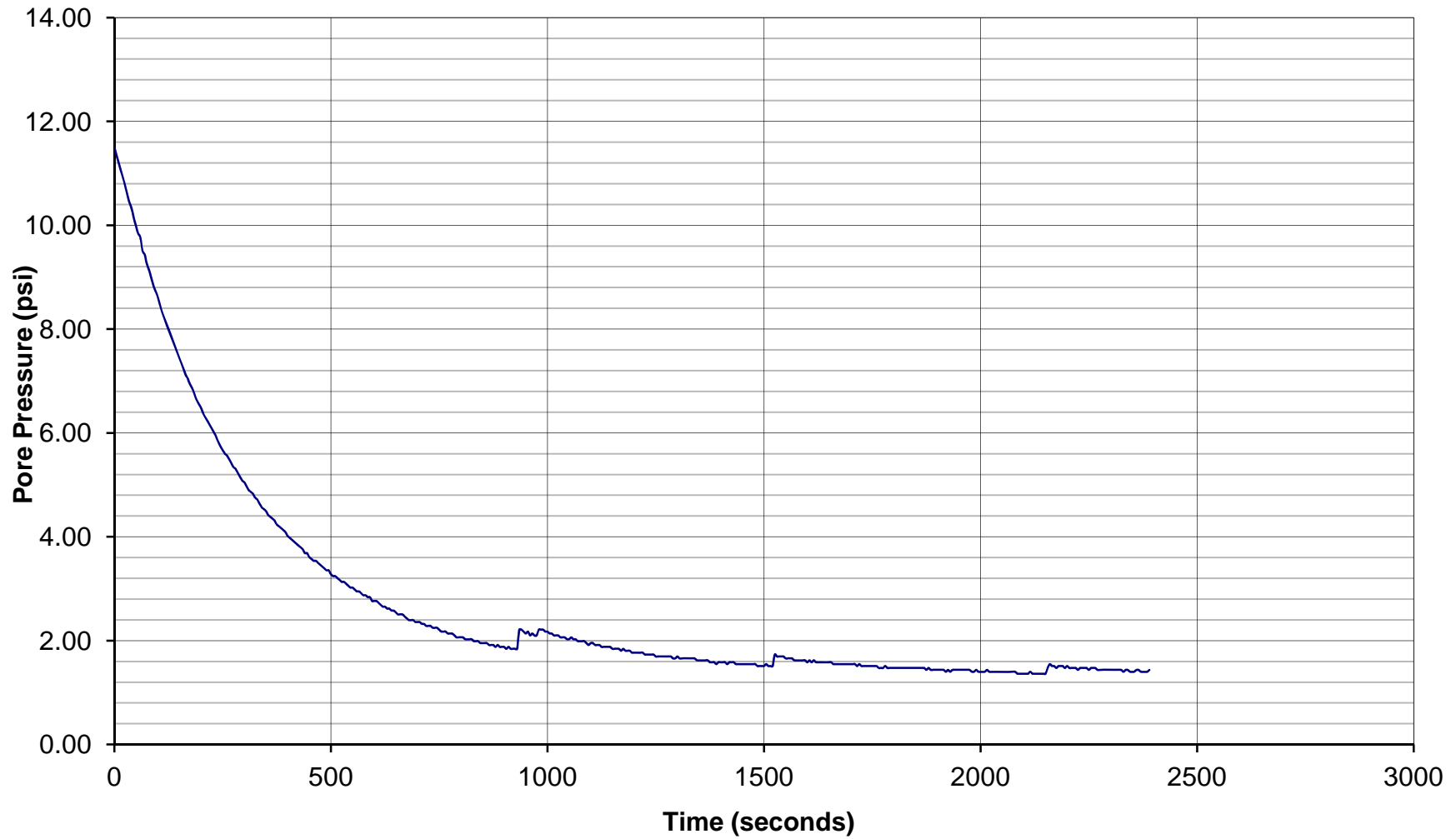




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0001CPT
Depth: 50.03 feet
Site: Fresno
Engineer: B. Kluzniak

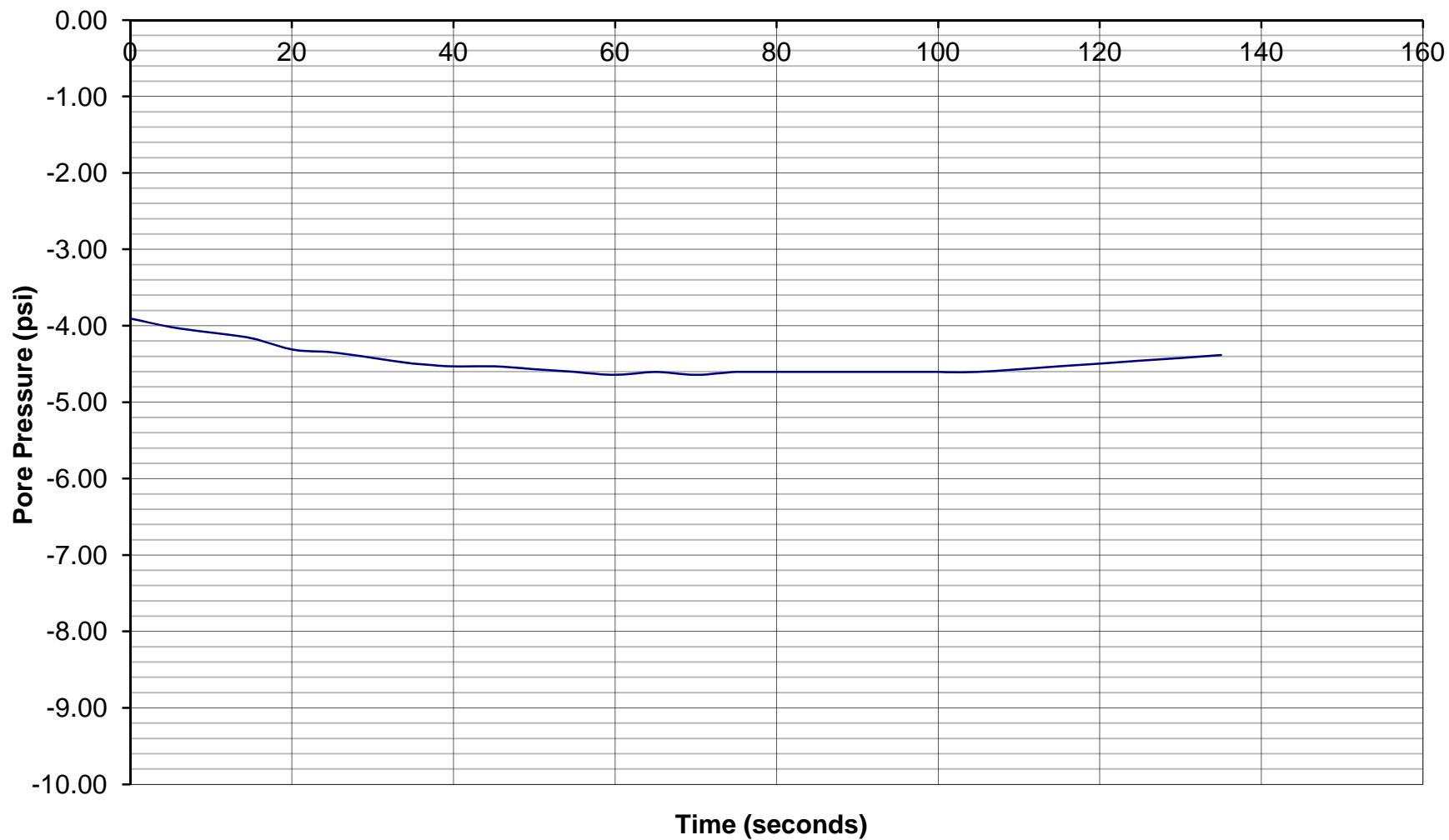




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0005CPT
Depth: 76.77 feet
Site: Fresno
Engineer: B. Kluzniak

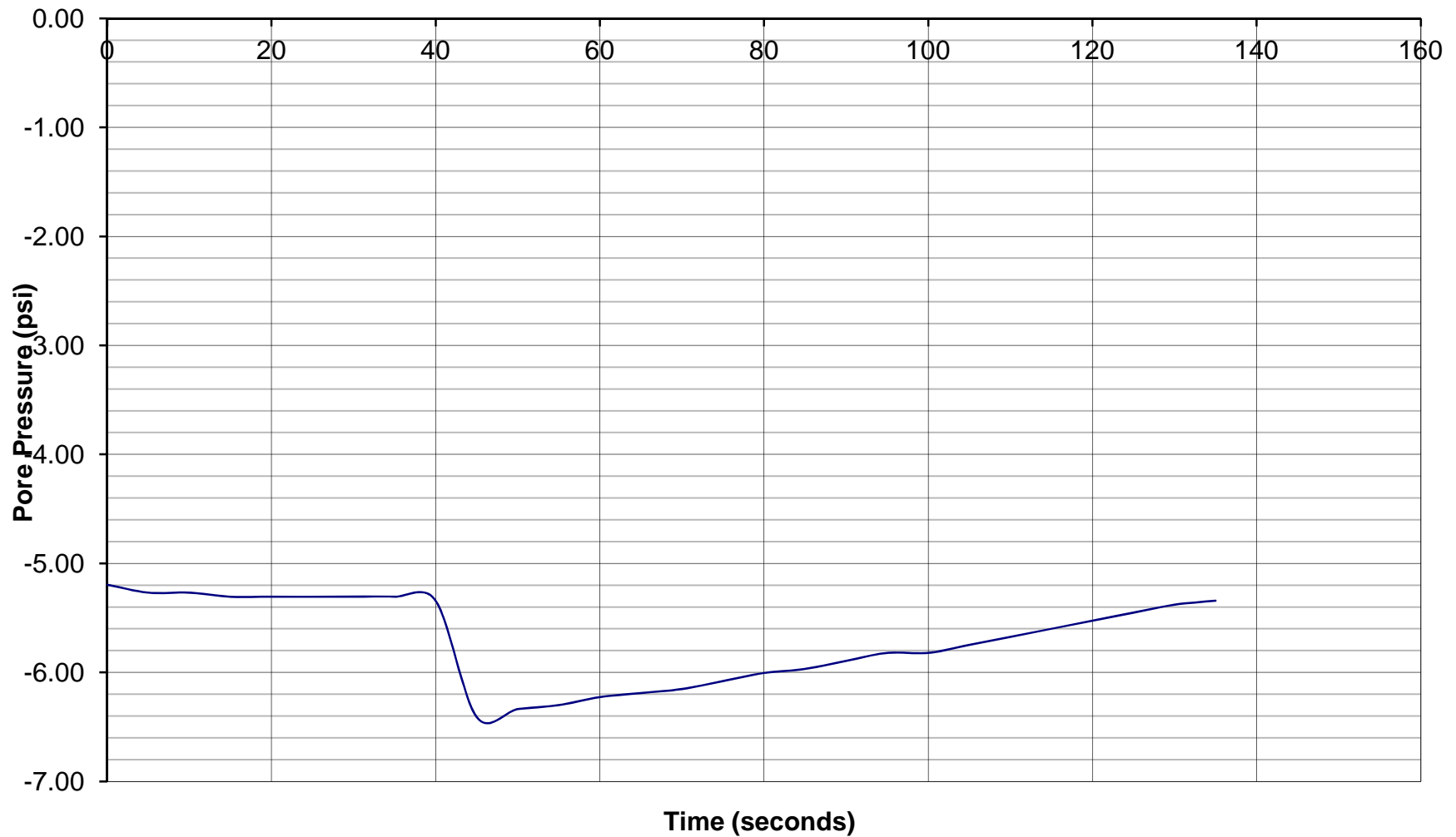




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0006CPT
Depth: 80.05 feet
Site: Fresno
Engineer: B. Kluzniak

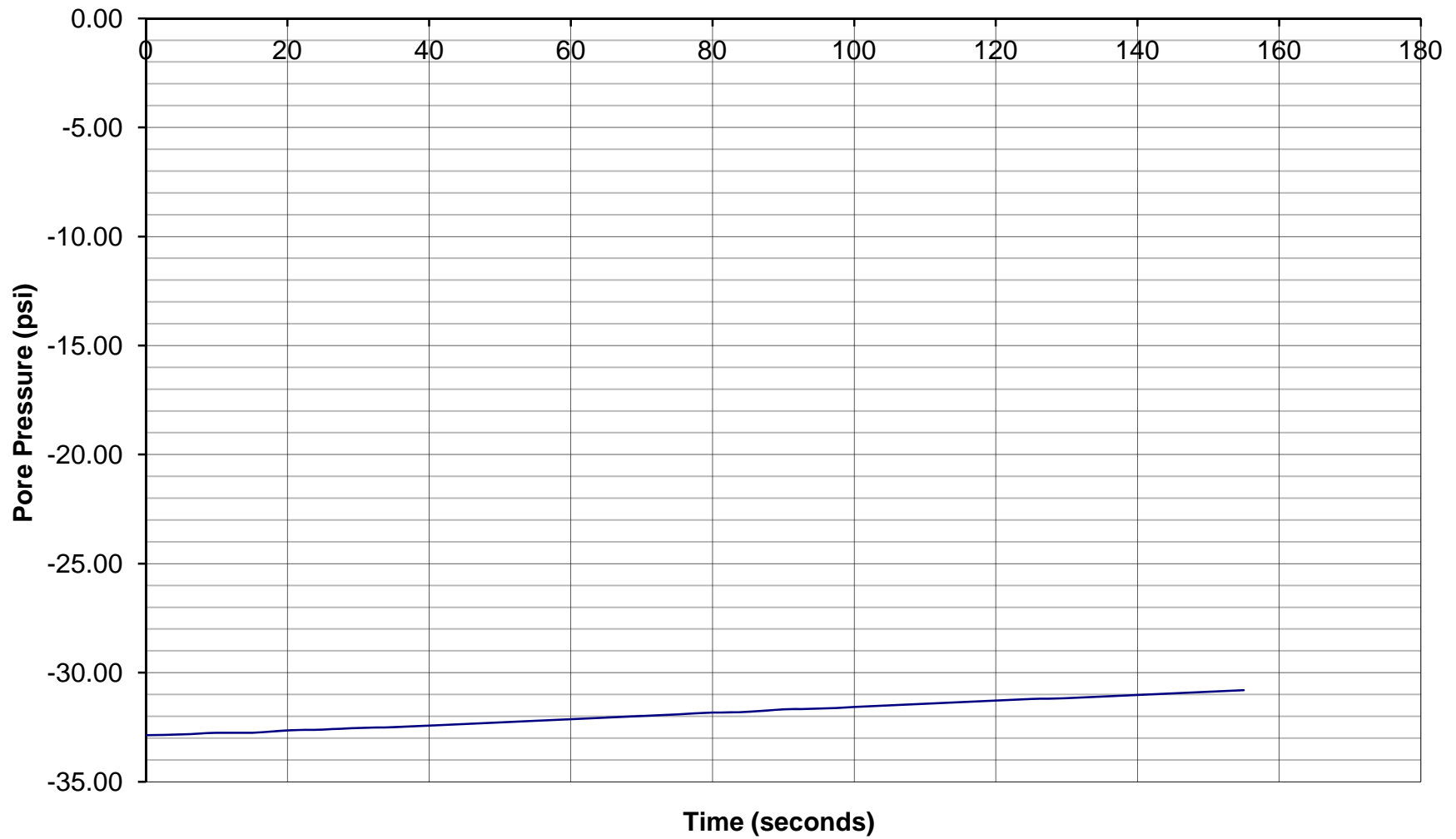




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0008ACPT
Depth: 99.41 feet
Site: Fresno
Engineer: B. Kluzniak

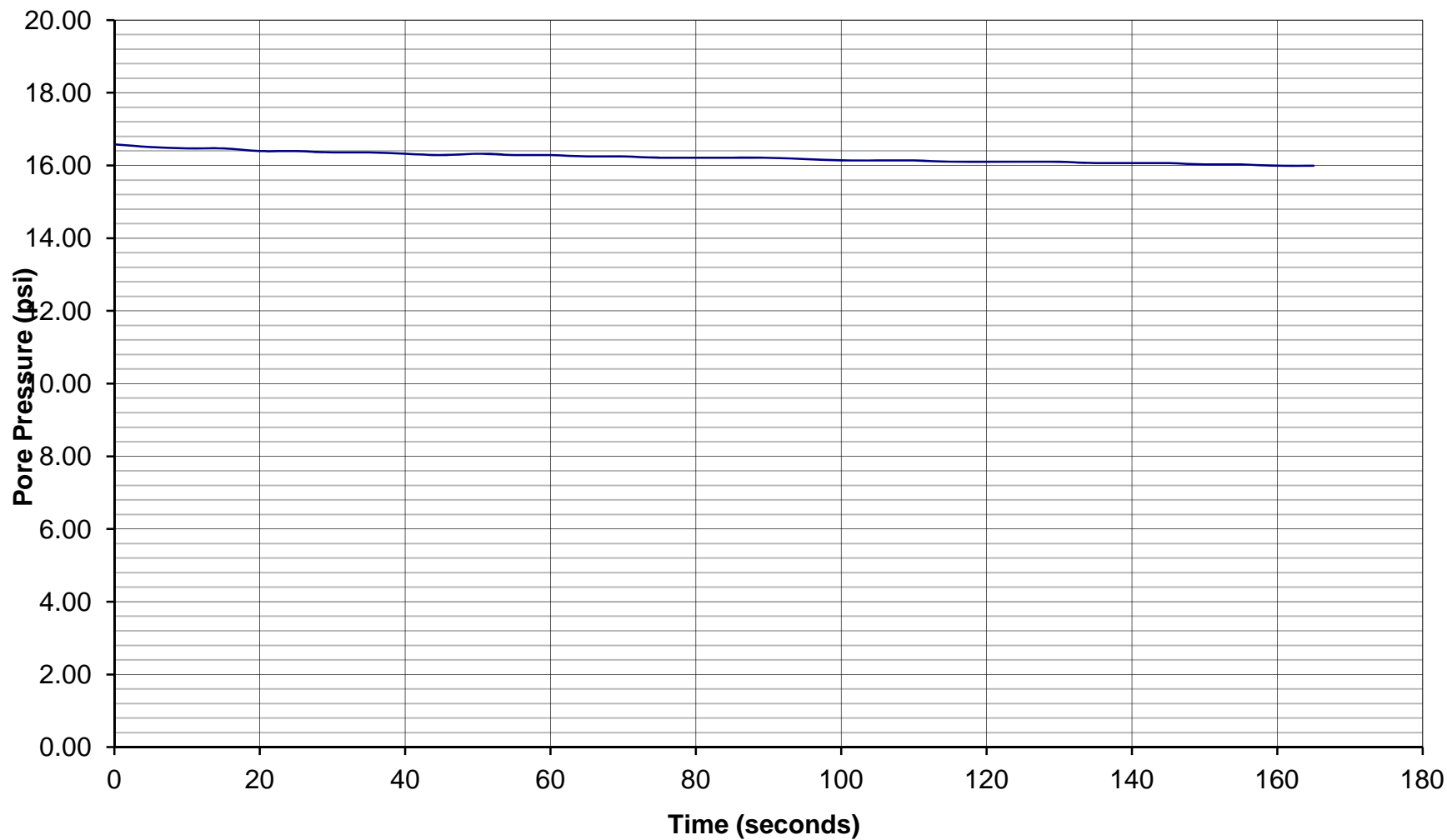




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0009CPT
Depth: 104.99 feet
Site: Fresno
Engineer: B. Kluzniak

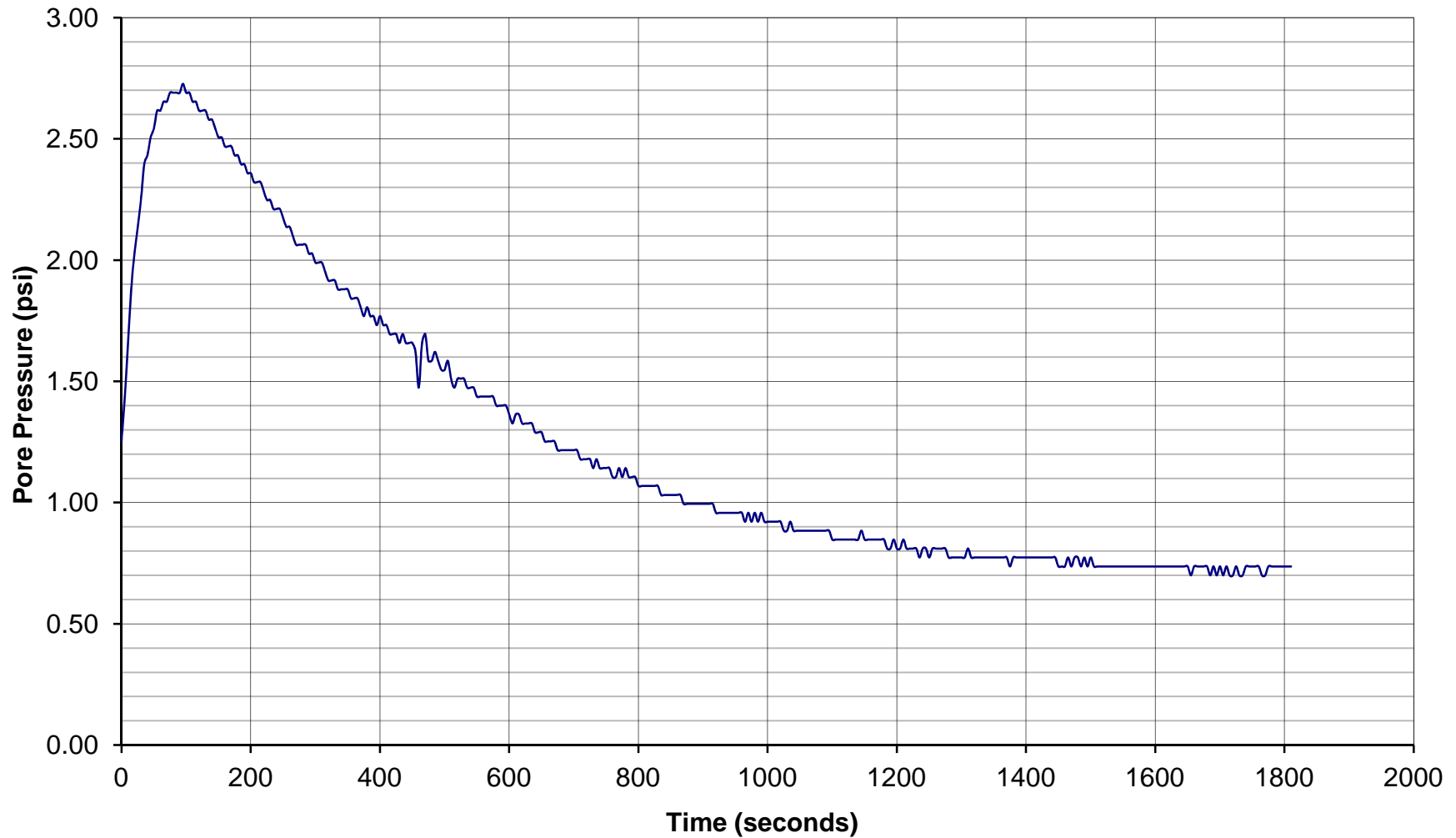




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0009CPT
Depth: 105.81 feet
Site: Fresno
Engineer: B. Kluzniak

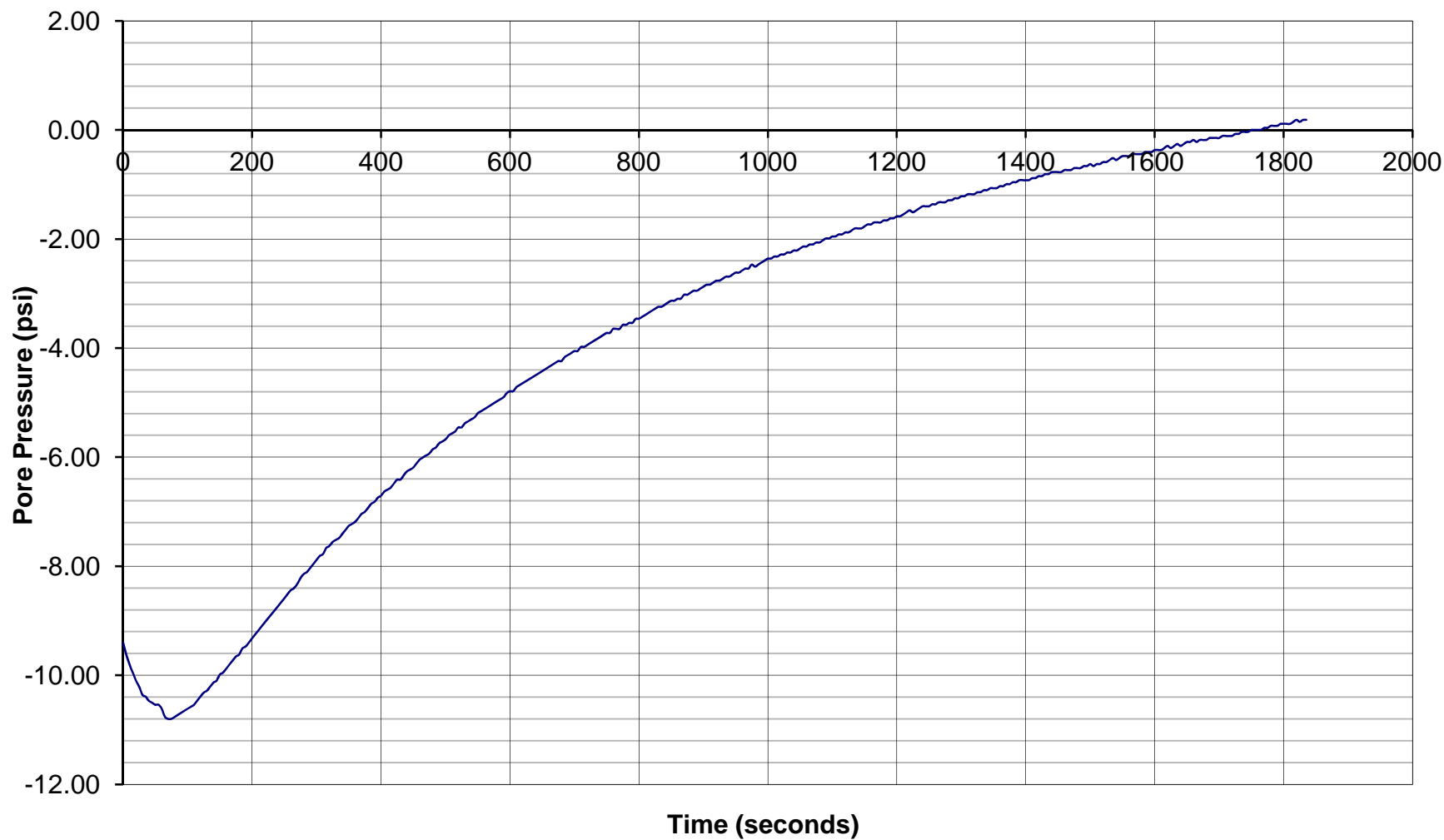




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0012CPT
Depth: 102.2 feet
Site: Fresno
Engineer: B. Kluzniak

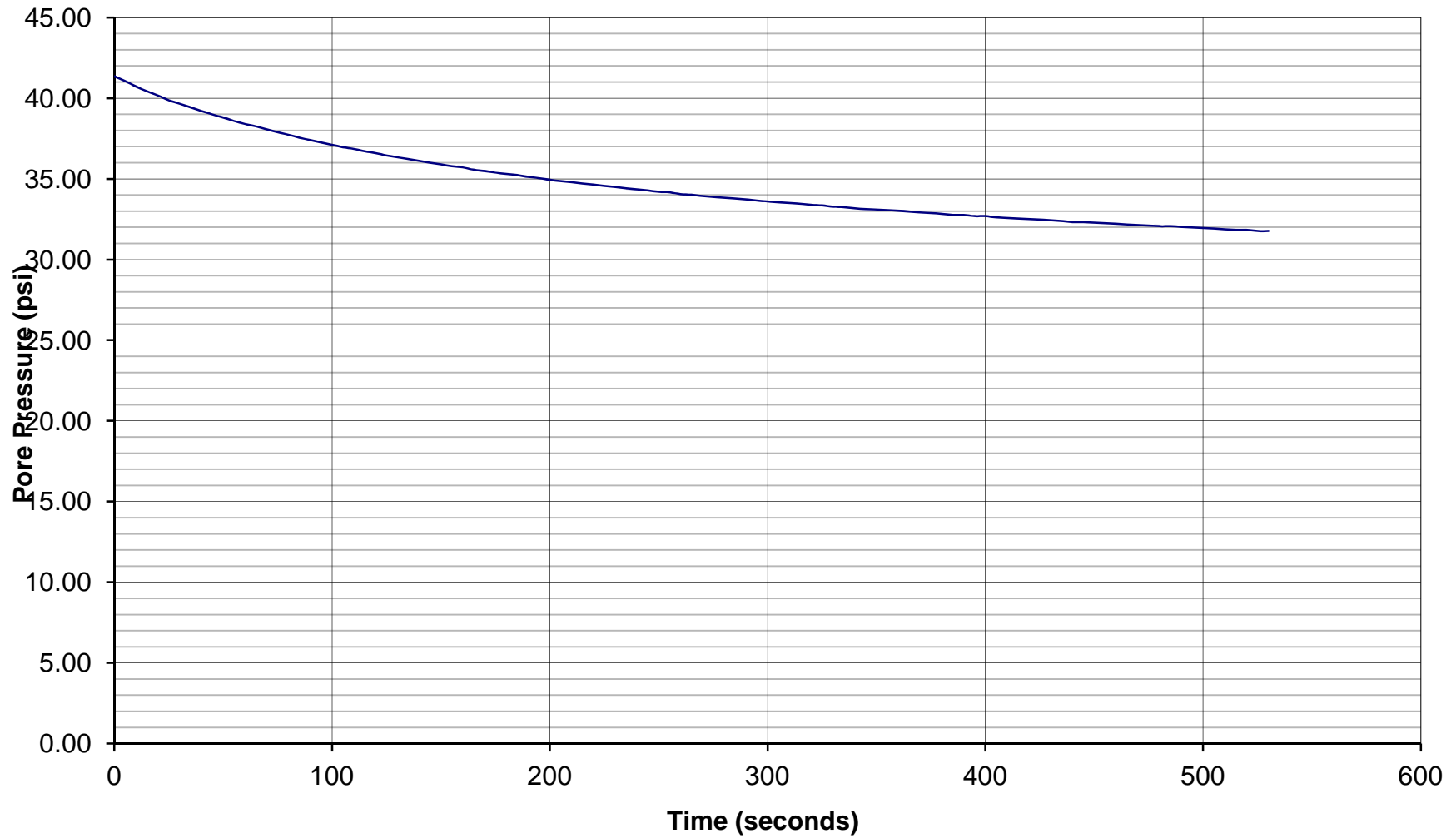




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0016CPT
Depth: 50.36 feet
Site: Fresno
Engineer: B. Kluzniak

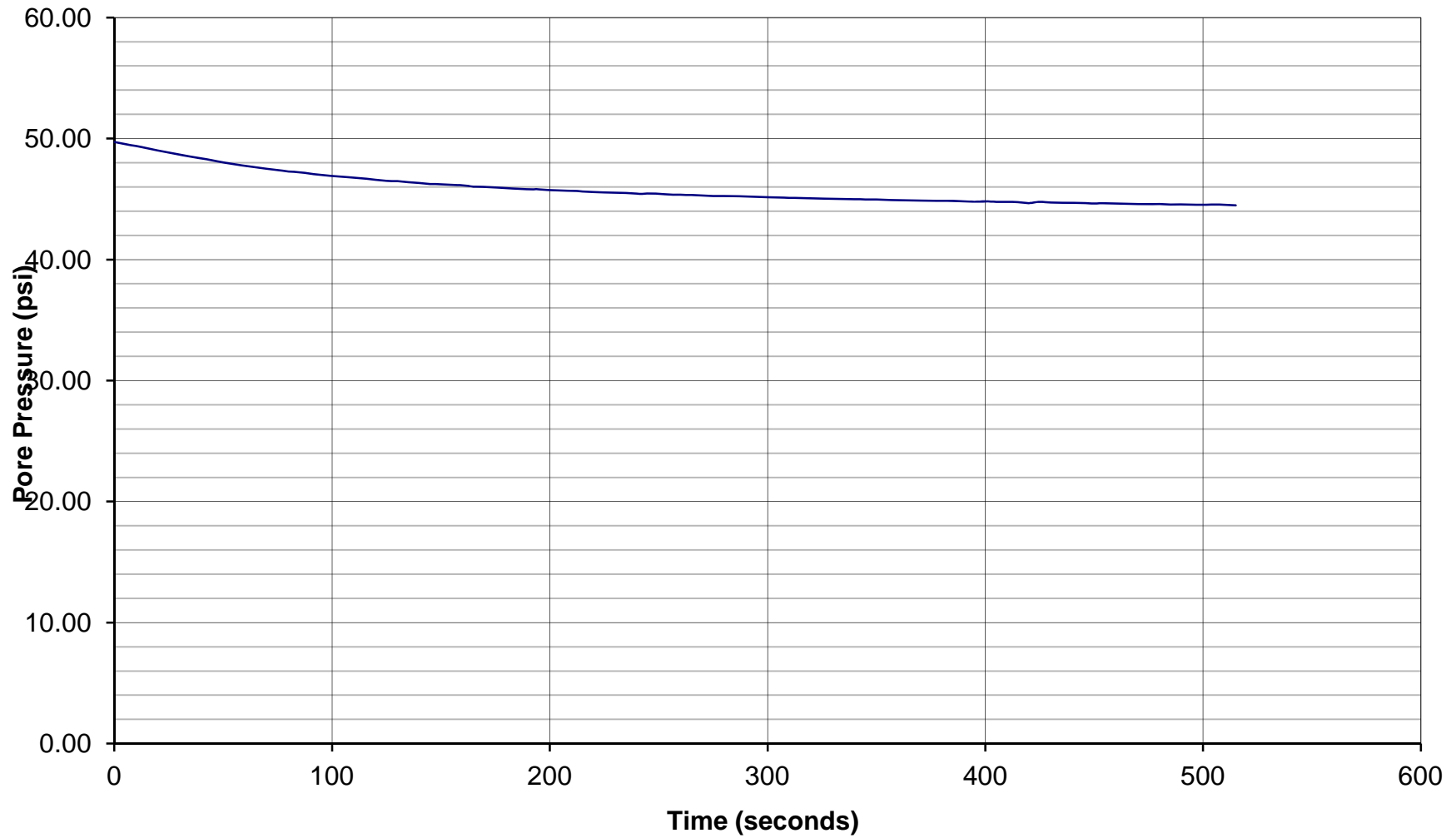




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0022CPT
Depth: 80.05 feet
Site: Fresno
Engineer: B. Kluzniak

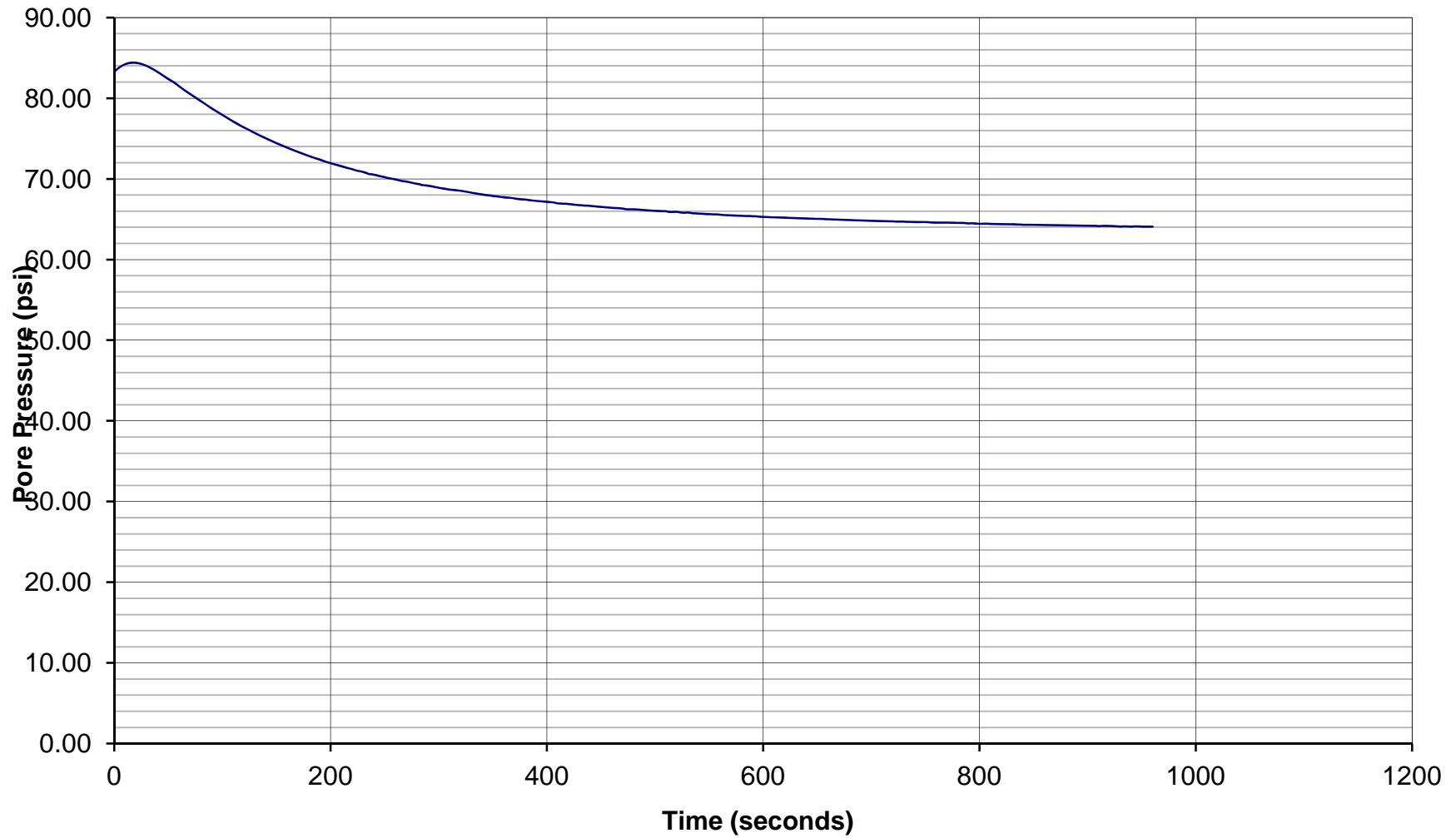




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0023ACPT
Depth: 113.52 feet
Site: Fresno
Engineer: B. Kluzniak

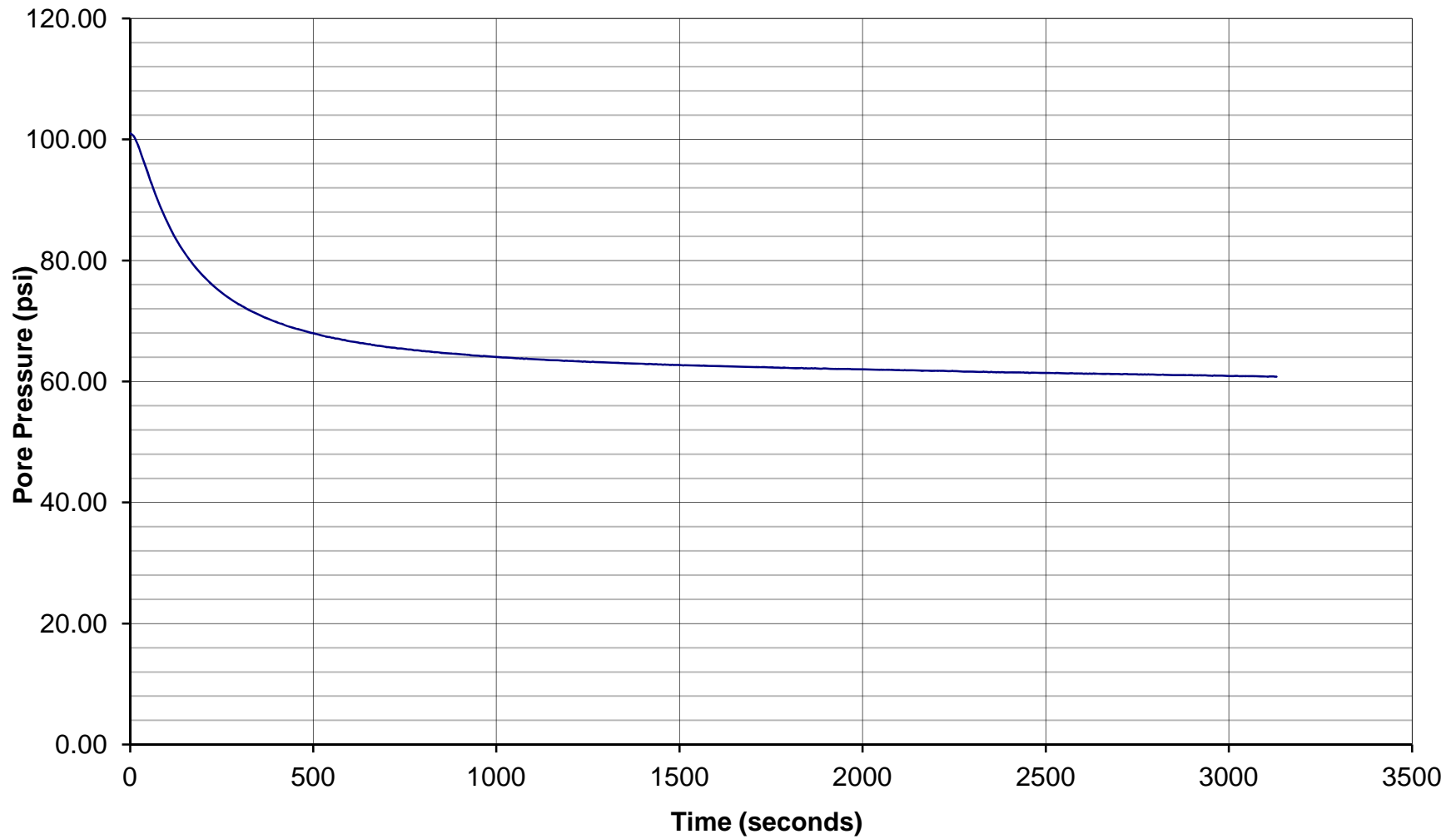




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0023ACPT
Depth: 129.59 feet
Site: Fresno
Engineer: B. Kluzniak

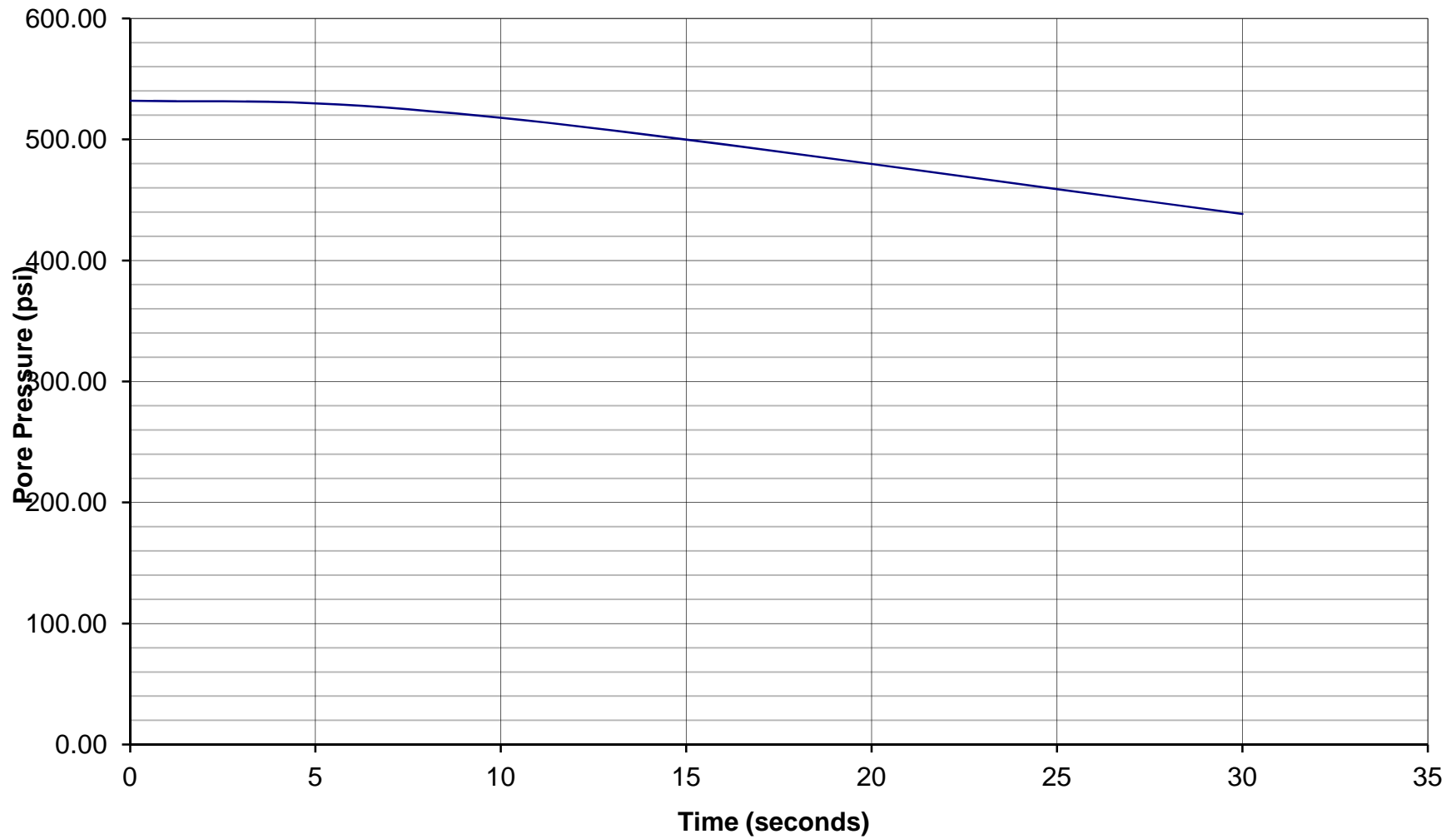




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0023ACPT
Depth: 150.59 feet
Site: Fresno
Engineer: B. Kluzniak

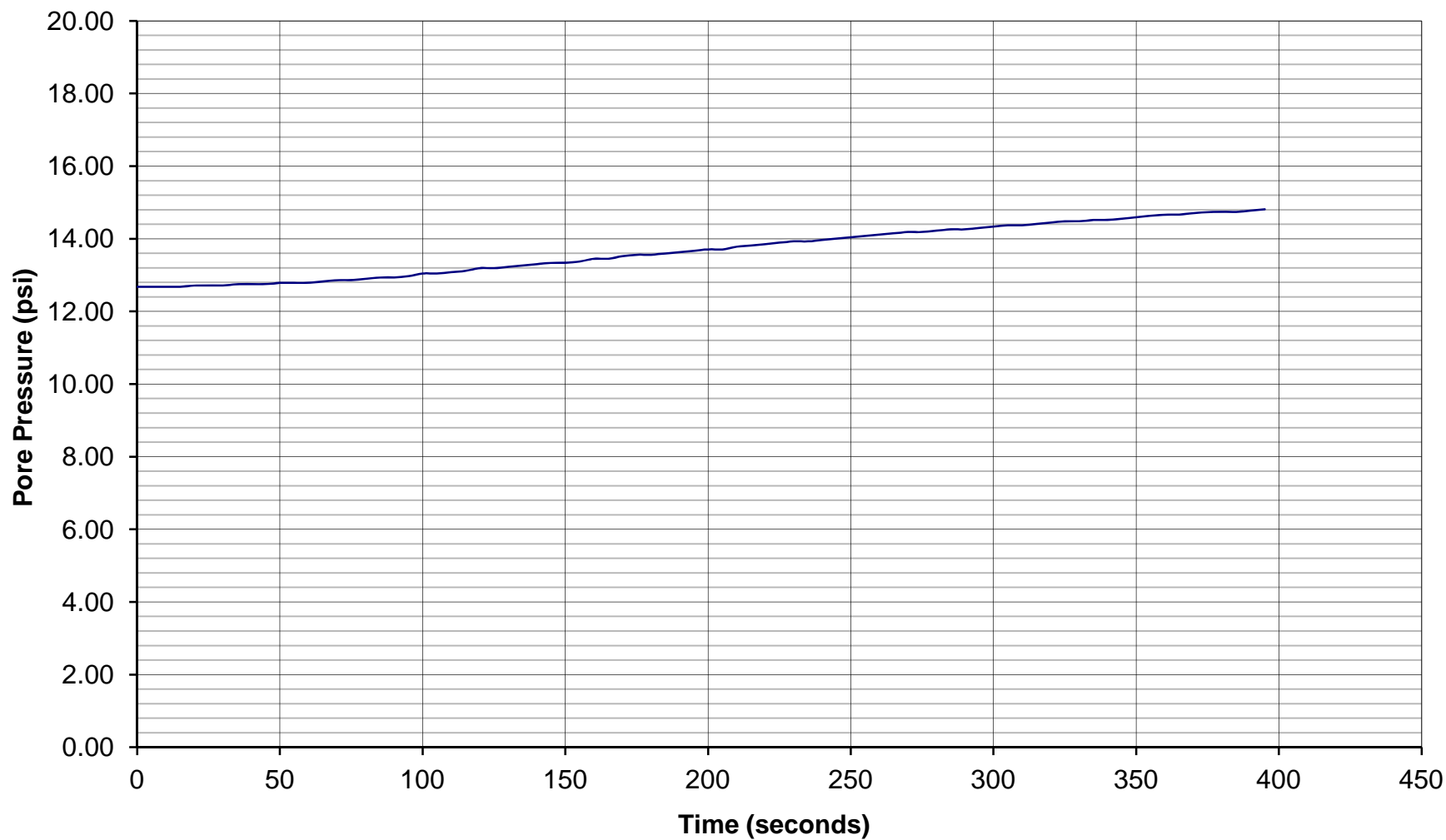




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0024CPT
Depth: 80.05 feet
Site: Fresno
Engineer: B. Kluzniak

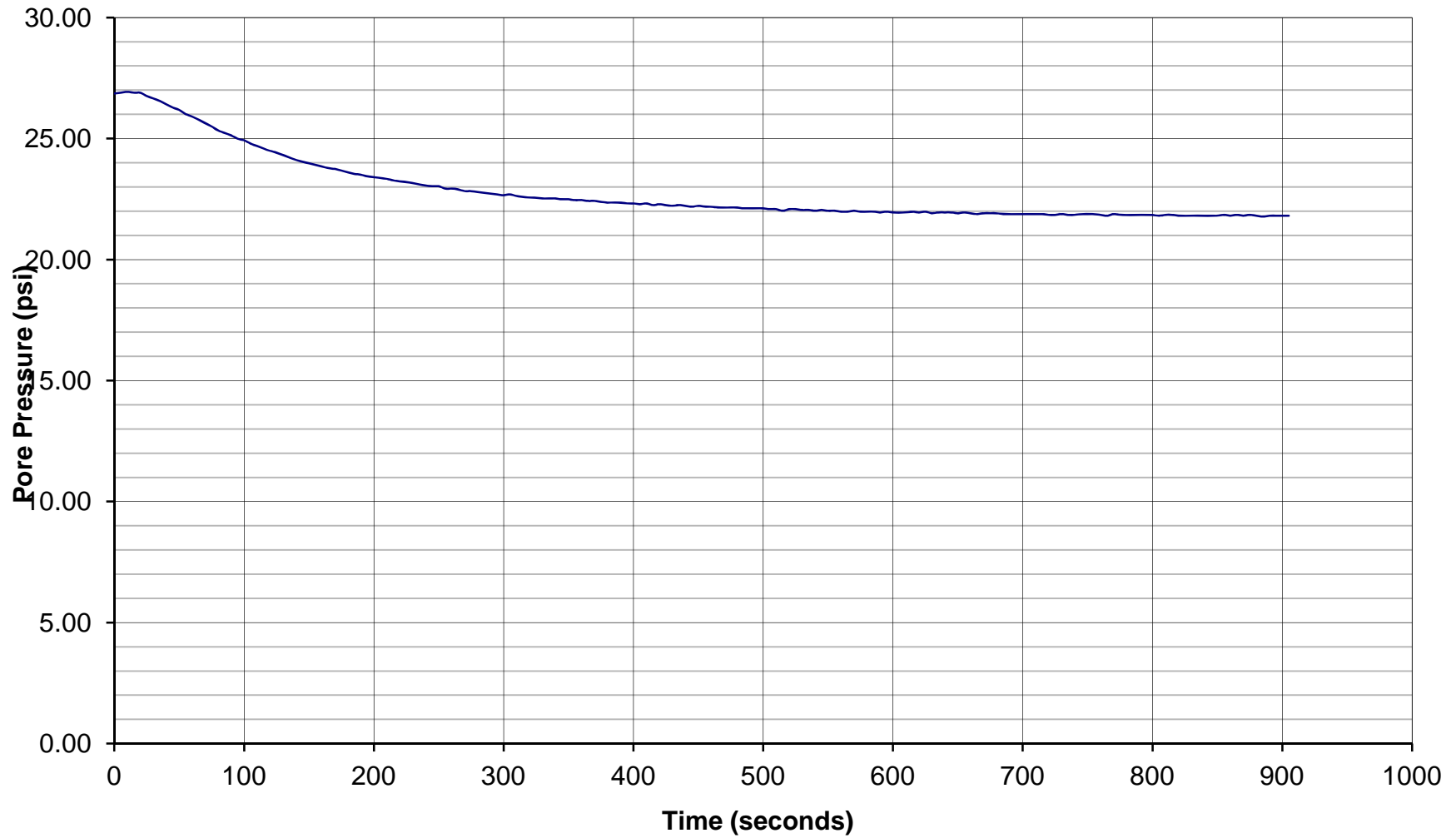




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0025CPT
Depth: 118.44 feet
Site: Fresno
Engineer: B. Kluzniak

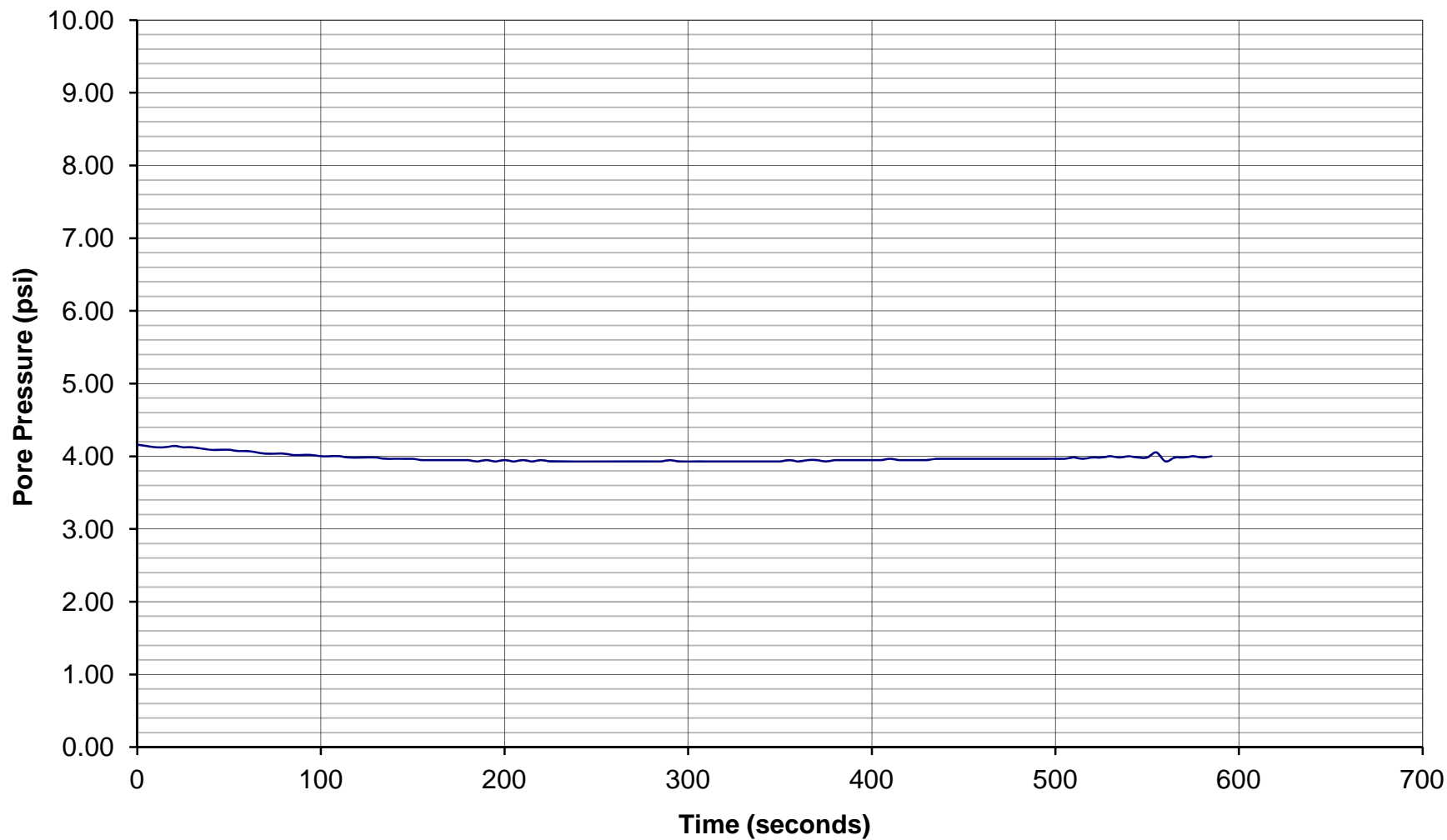




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0029CPT
Depth: 80.05 feet
Site: Fresno
Engineer: B. Kluzniak

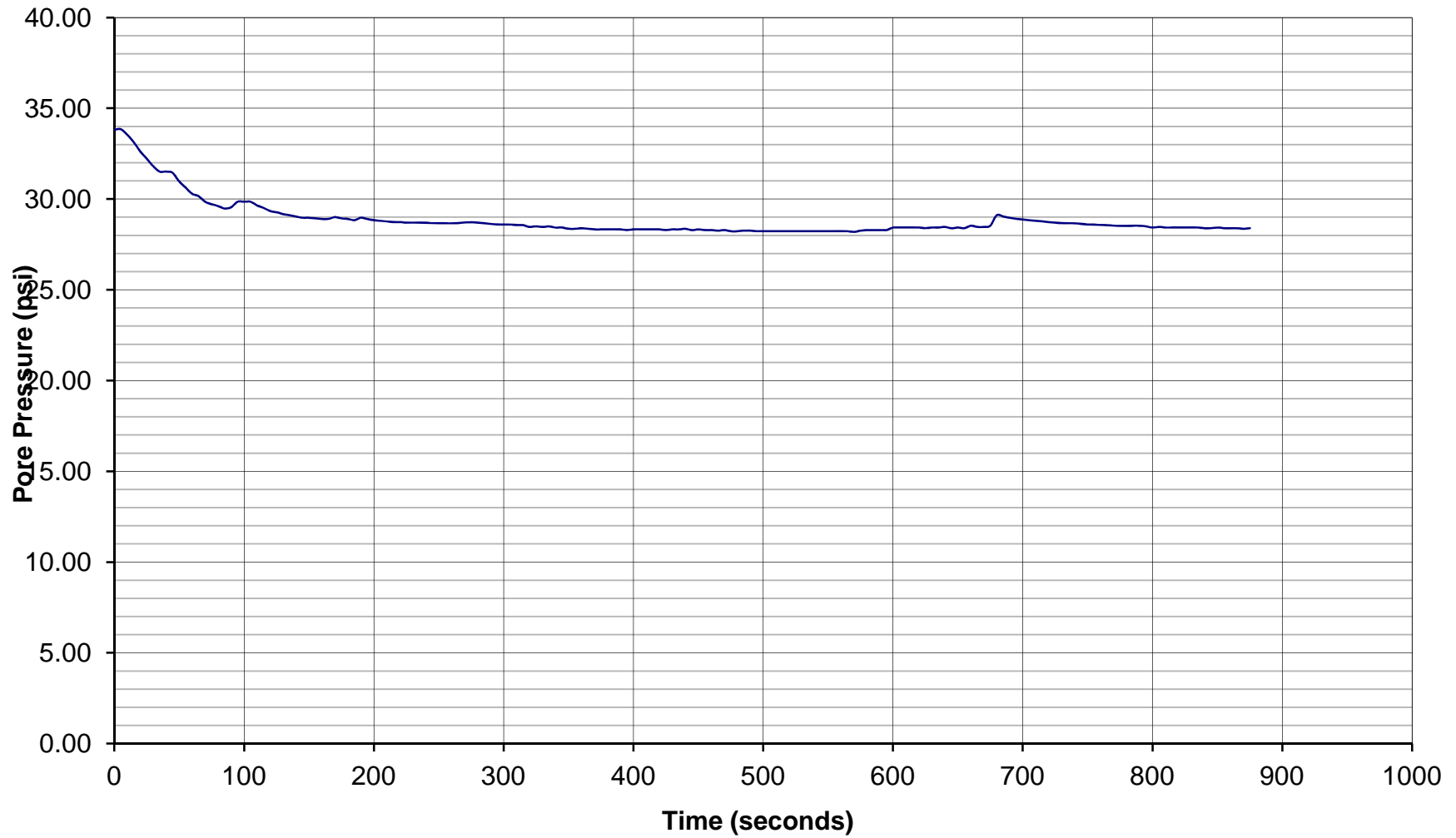




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0031CPT
Depth: 150.43 feet
Site: Fresno
Engineer: B. Kluzniak





GREGG DRILLING & TESTING

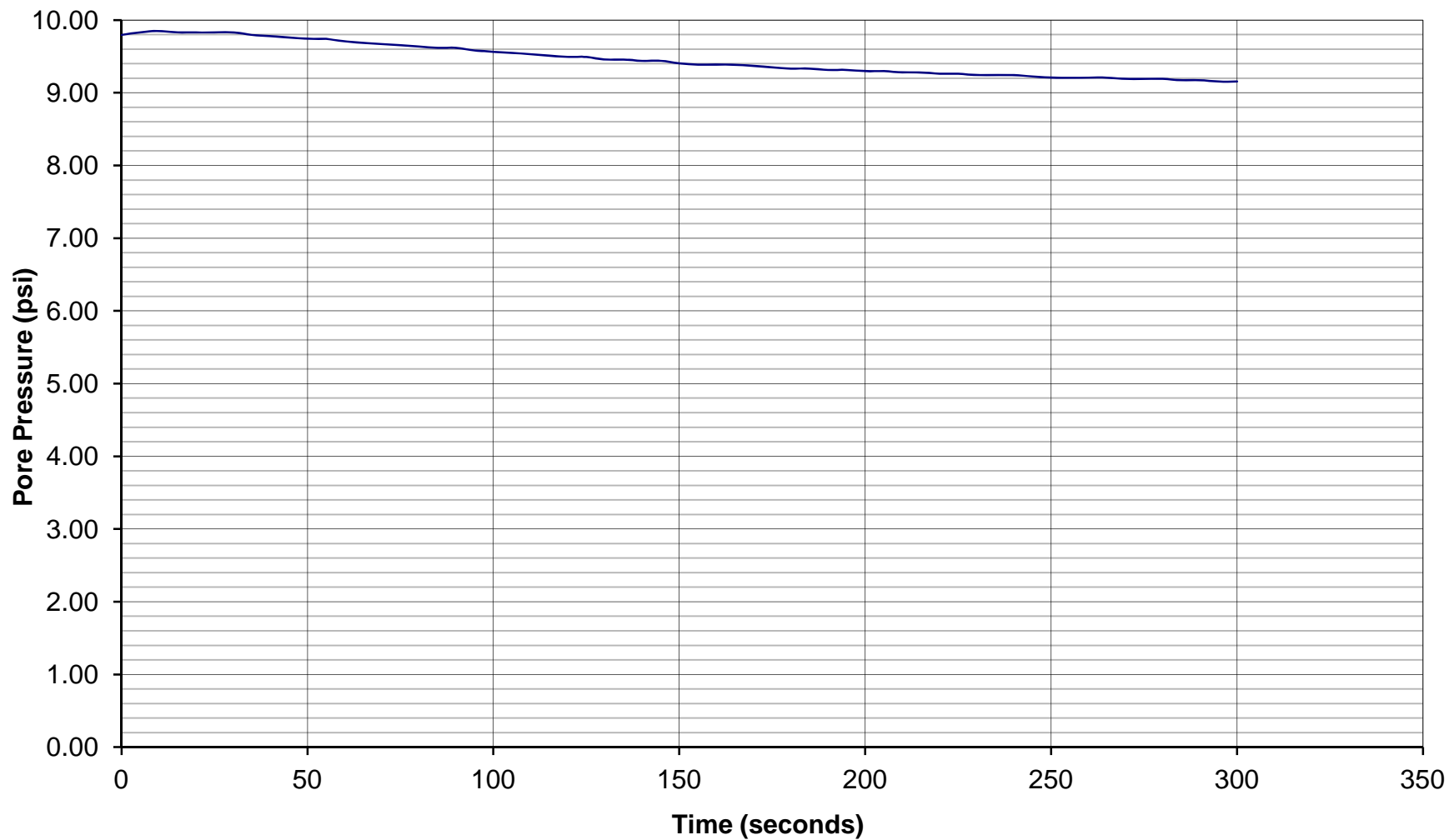
Pore Pressure Dissipation Test

Sounding: S0032CPT

Depth: 90.22 feet

Site: Fresno

Engineer: B. Kluzniak

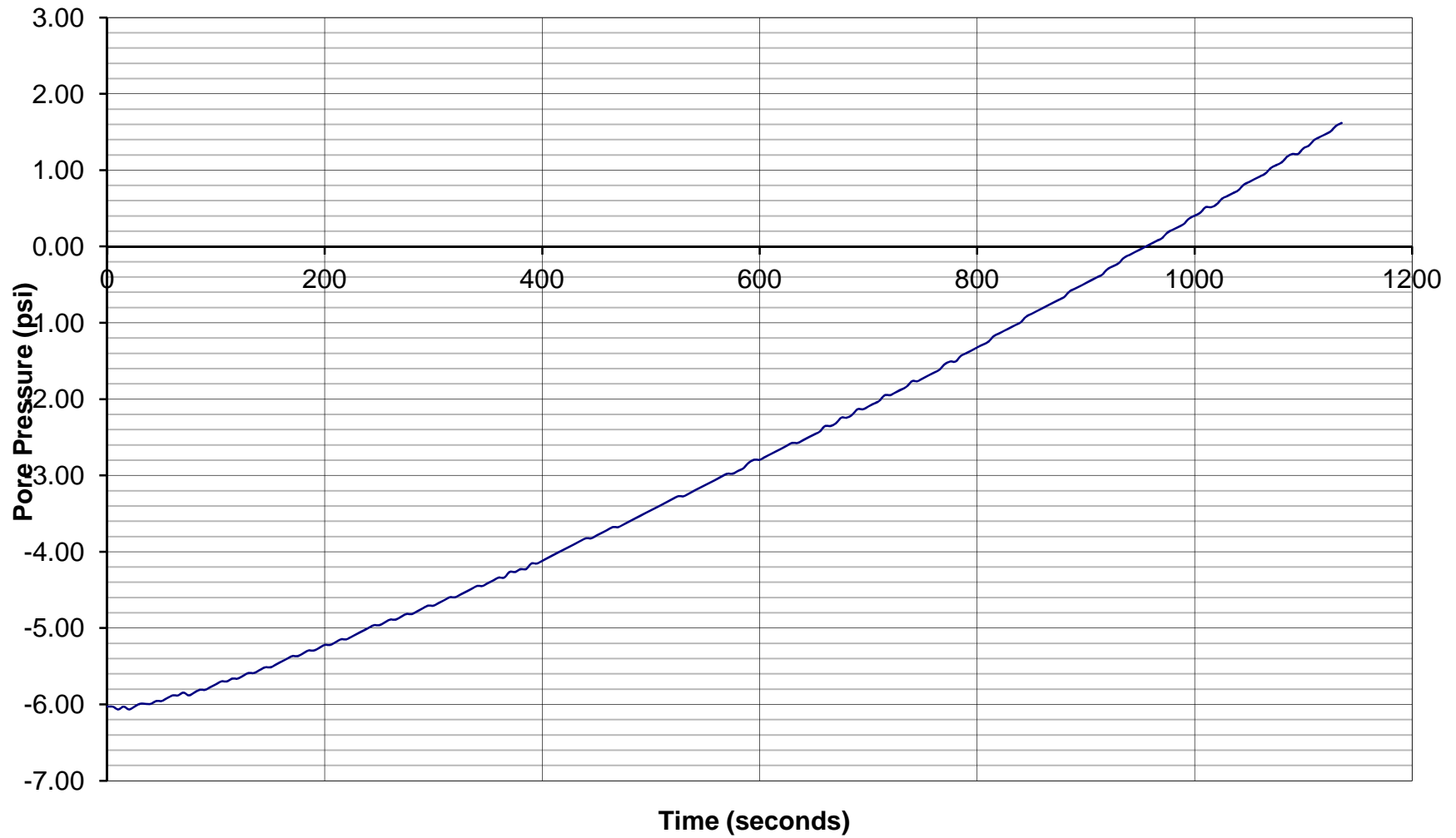




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0034ACPT
Depth: 95.14 feet
Site: Fresno
Engineer: B. Kluzniak

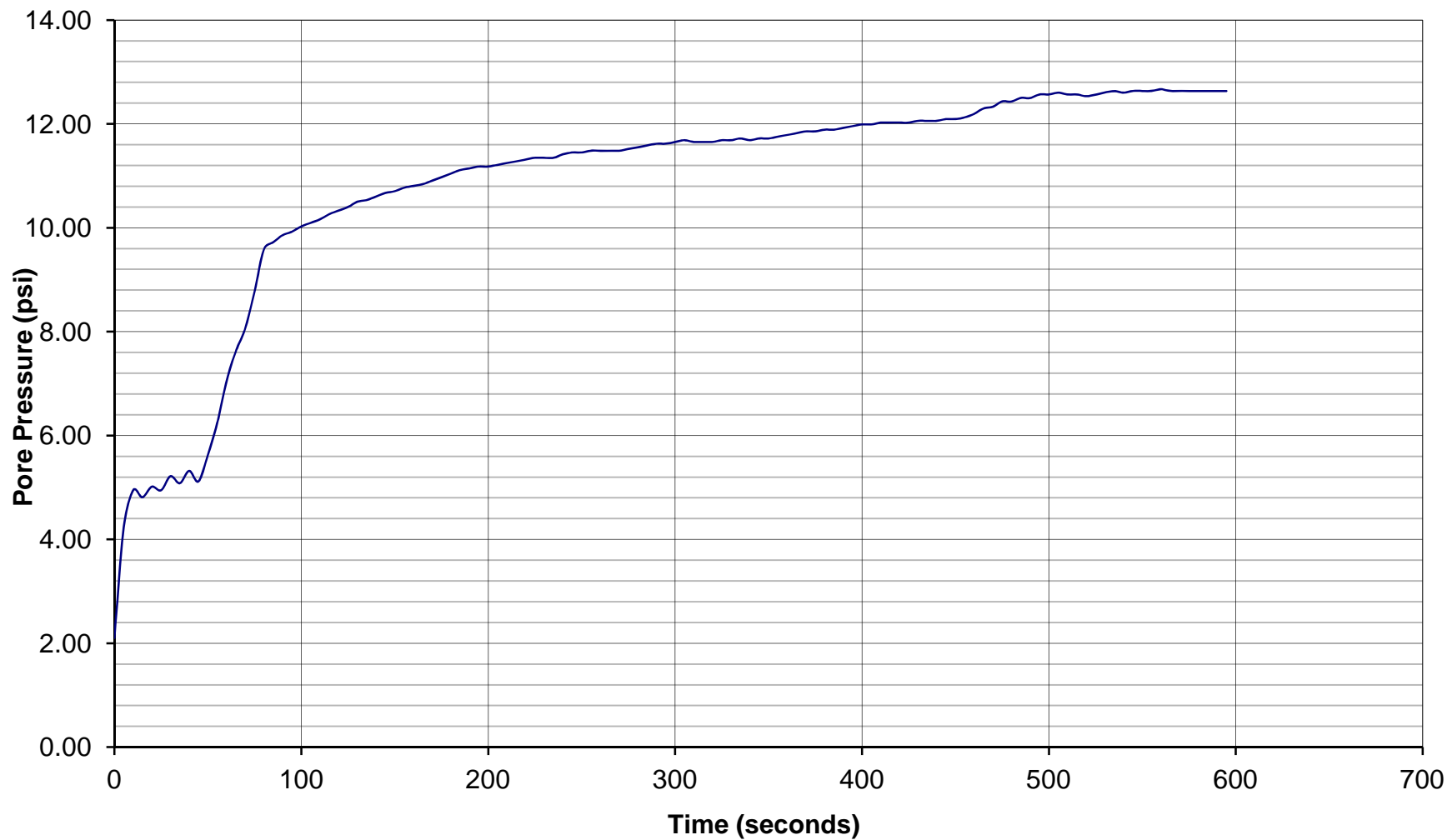




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0035CPT
Depth: 94 feet
Site: Fresno
Engineer: B. Kluzniak

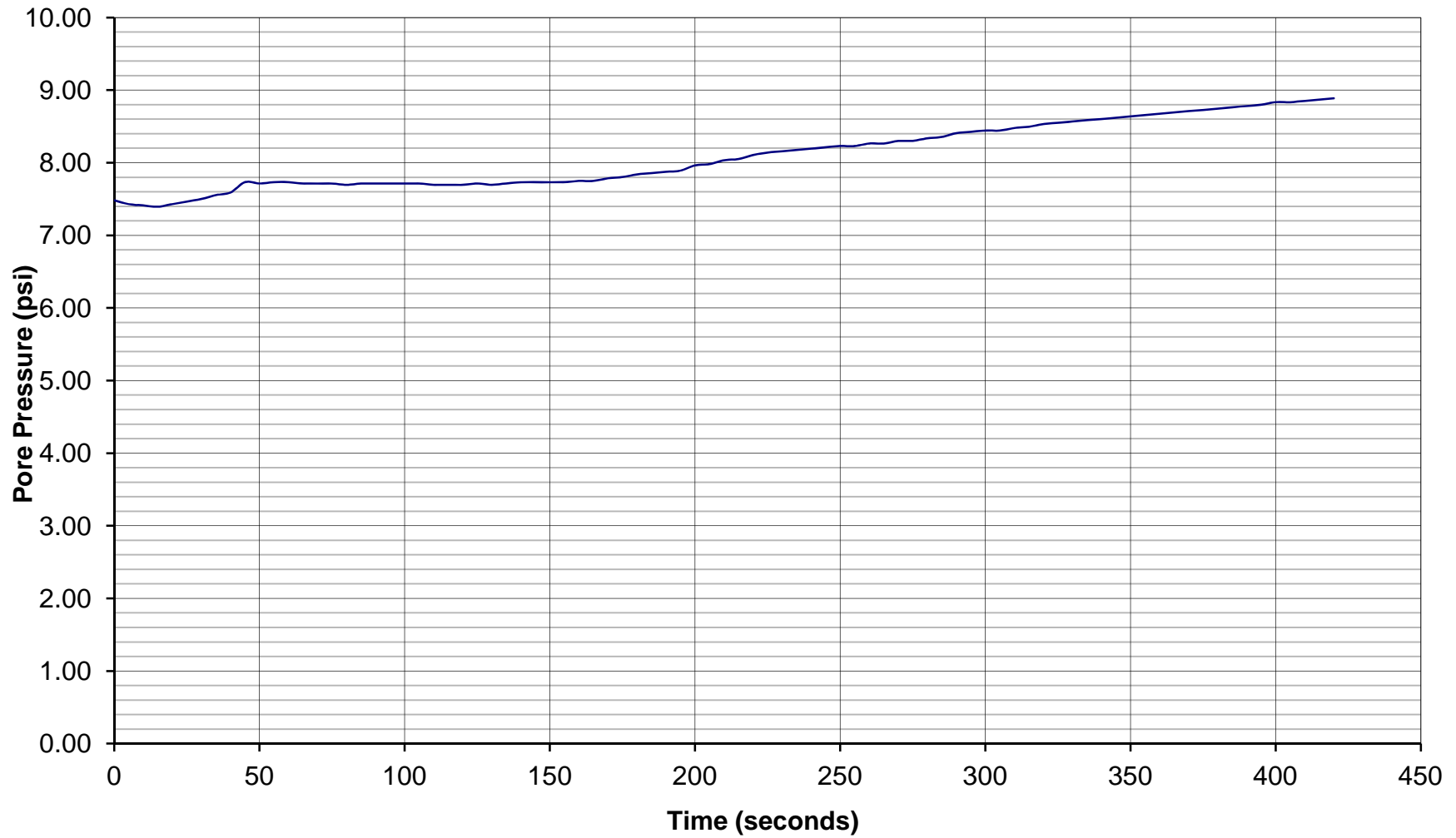




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0036ACPT
Depth: 100.39 feet
Site: Fresno
Engineer: B. Kluzniak

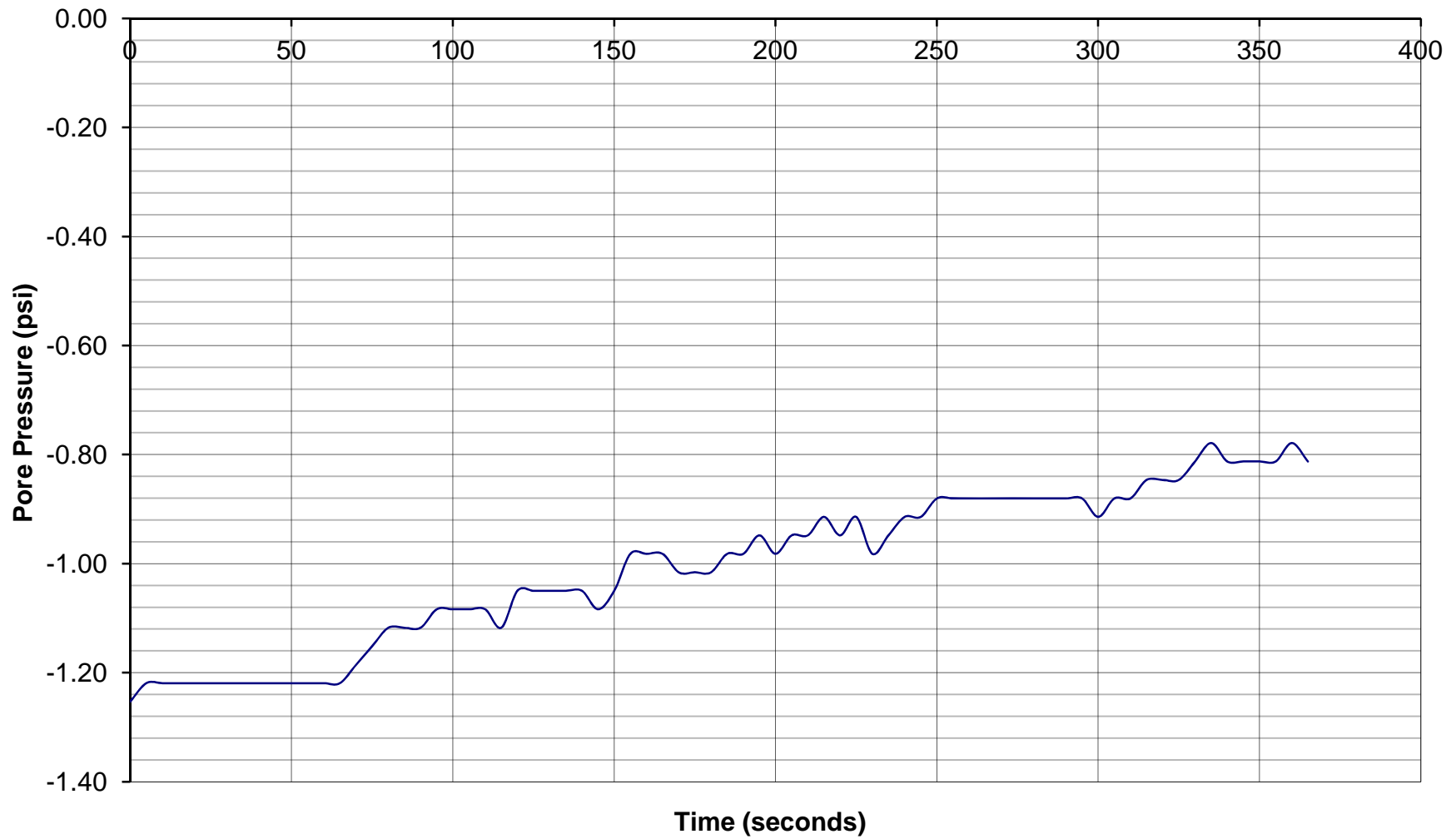




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0037CPT
Depth: 24.11 feet
Site: Fresno
Engineer: B. Kluzniak

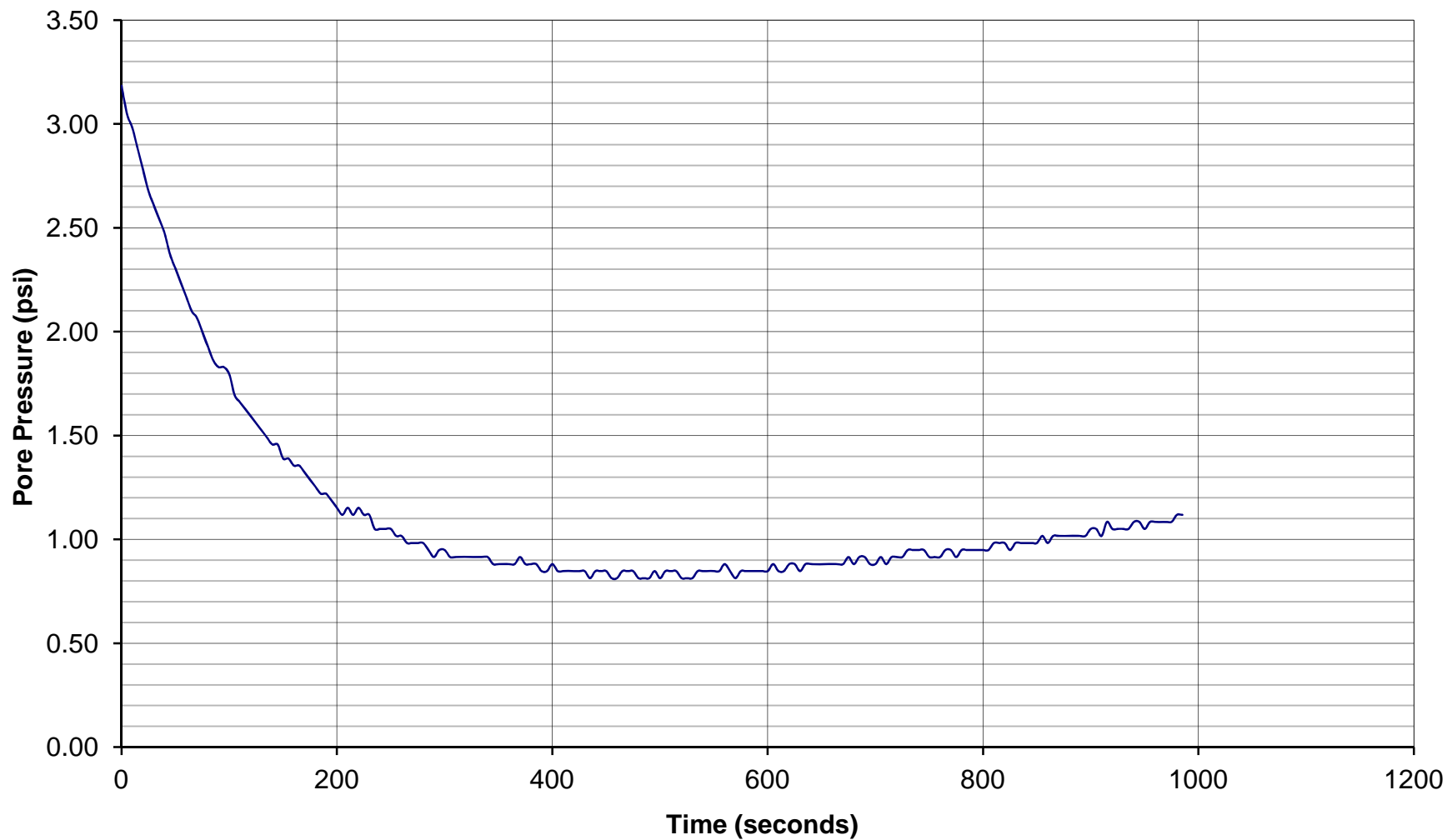




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0037CPT
Depth: 80.05 feet
Site: Fresno
Engineer: B. Kluzniak

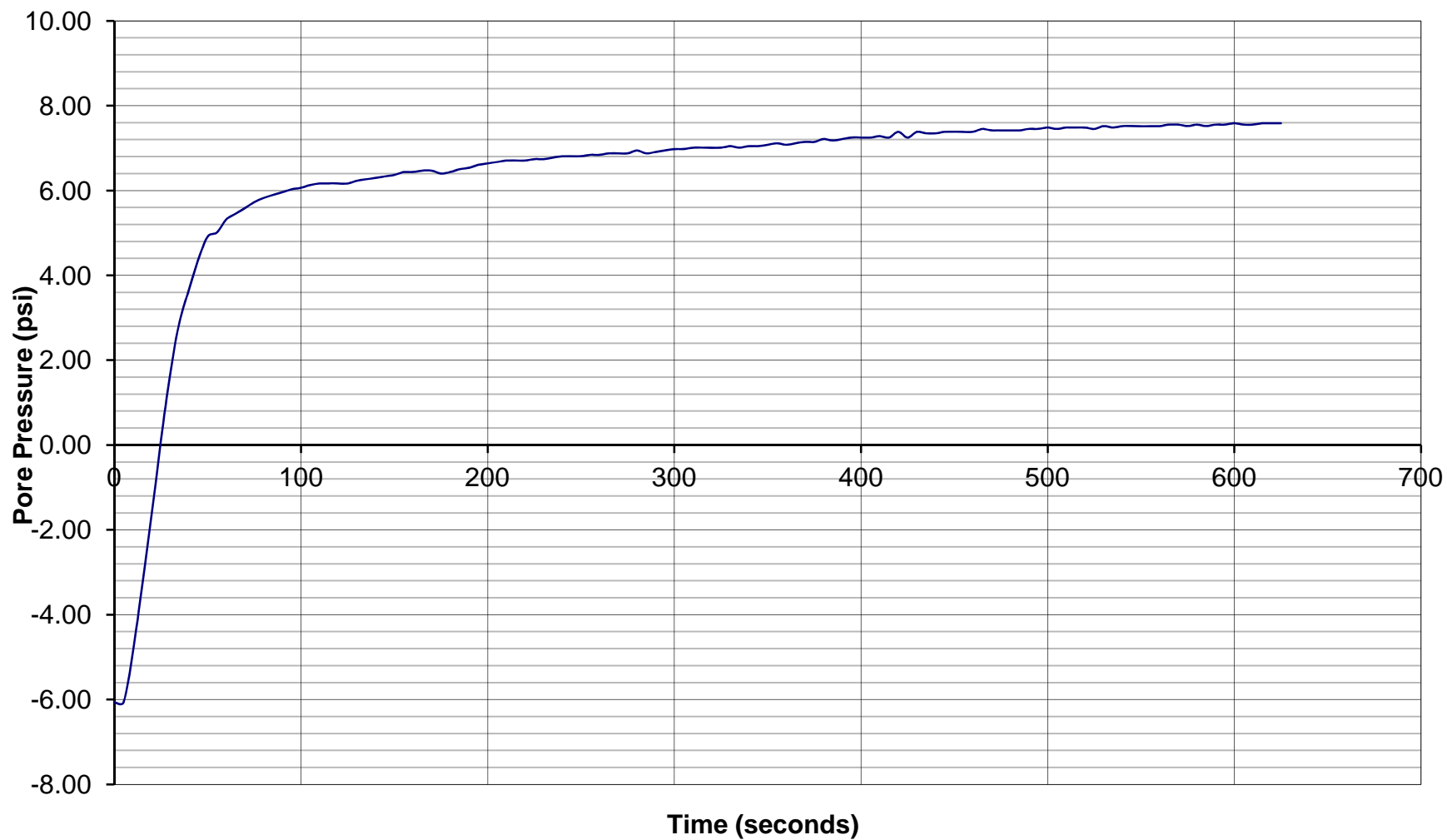




GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: S0041CPT
Depth: 80.22 feet
Site: Fresno
Engineer: B. Kluzniak



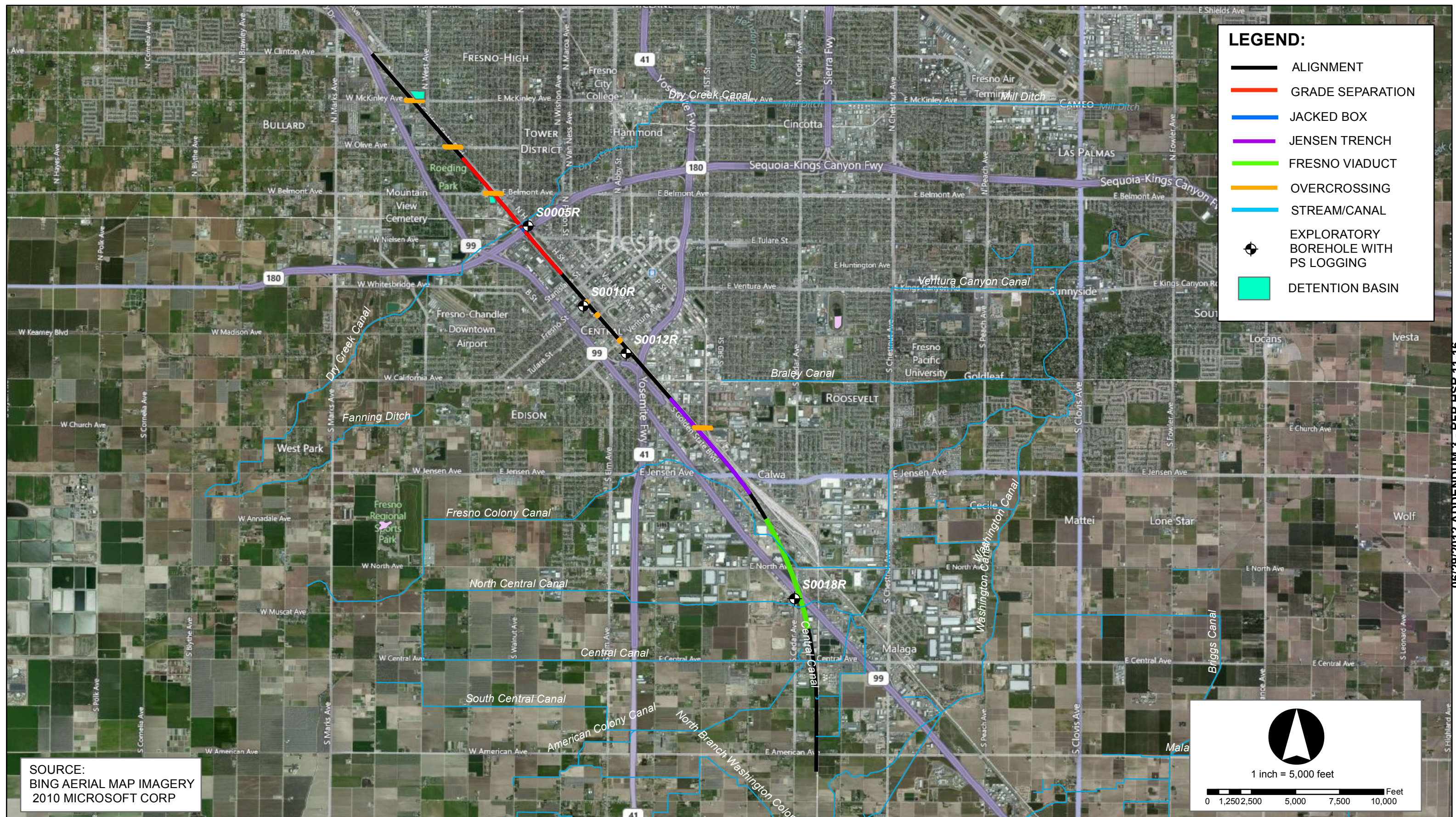
Appendix D

PS Logging Records —

GEOVision Geophysical Services

Table D-1
Summary of PS Logging Locations, Depths, and Dates Logged

Borehole ID	Date Logged	Elevation (NAVD88) (ft)	Northing (NAD83) (ft)	Easting (NAD83) (ft)	Depth Interval ^[1]	
					Top Depth (ft)	Bottom Depth (ft)
S0005R	10/17/2011	285.30	2,155,457	6,325,239	6.6	82
S0010R	10/19/2011	286.10	2,150,922	6,328,342	6.6	152.6
S0012R	10/25/2011	287.60	2,148,215	6,330,774	1.6	150.9
S0018R	10/28/2011	305.80	2,134,428	6,340,369	26.3	149.3
^[1] Logging performed at 1.6 foot intervals between top and bottom depths						





**CALIFORNIA HIGH SPEED TRAIN
FRESNO TO BAKERSFIELD,
BORINGS S0005R, S0010R, S0012R
AND S0018R VELOCITIES**

Report 11349-03 Rev 1

February 1, 2012

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

**CALIFORNIA HIGH SPEED TRAIN
FRESNO TO BAKERSFIELD,
BORINGS S0005R, S0010R, S0012R
AND S0018R VELOCITIES**

Report 11349-03 Rev 1

February 1, 2012

Prepared for:

Gregg Drilling & Testing, Inc.

950 Howe Road

Martinez, California 94553

925-313-5800

Prepared by

GEOVision Geophysical Services

1124 Olympic Drive

Corona, California 92881

(951) 549-1234

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

TABLE OF CONTENTS

TABLE OF CONTENTS	3
TABLE OF FIGURES	4
TABLE OF TABLES.....	4
INTRODUCTION.....	5
SCOPE OF WORK	5
INSTRUMENTATION	7
SUSPENSION INSTRUMENTATION	7
MEASUREMENT PROCEDURES	10
SUSPENSION MEASUREMENT PROCEDURES	10
DATA ANALYSIS.....	11
SUSPENSION ANALYSIS.....	11
RESULTS	13
SUSPENSION RESULTS	13
SUMMARY.....	14
DISCUSSION OF SUSPENSION RESULTS	14
QUALITY ASSURANCE	15
SUSPENSION DATA RELIABILITY	15

Table of Figures

Figure 1: Concept illustration of P-S logging system	16
Figure 2: Example of filtered (1400 Hz lowpass) record	17
Figure 3: Example of unfiltered record	18
Figure 4: Boring S0005R, Suspension R1-R2 P- and S _H -wave velocities	19
Figure 5: Boring S0010R, Suspension R1-R2 P- and S _H -wave velocities	21
Figure 6: Boring S0012R, Suspension R1-R2 P- and S _H -wave velocities	23
Figure 7: Boring S0018R, Suspension R1-R2 P- and S _H -wave velocities	25

Table of Tables

Table 1. Boring locations and logging dates	5
Table 2. Logging dates and depth ranges	10
Table 3. Boring S0005R, Suspension R1-R2 depths and P- and S _H -wave velocities	20
Table 4. Boring S0010R, Suspension R1-R2 depths and P- and S _H -wave velocities	22
Table 5. Boring S0012R, Suspension R1-R2 depths and P- and S _H -wave velocities	24
Table 6. Boring S0018R, Suspension R1-R2 depths and P- and S _H -wave velocities	26

APPENDICES

APPENDIX A SUSPENSION VELOCITY MEASUREMENT QUALITY ASSURANCE SUSPENSION SOURCE TO RECEIVER ANALYSIS RESULTS

APPENDIX B GEOPHYSICAL LOGGING SYSTEMS - NIST TRACEABLE CALIBRATION RECORDS

INTRODUCTION

Boring geophysical measurements were collected in four uncased borings located along the proposed alignment of the California High Speed Train, in Fresno, California. Geophysical data acquisition was performed on October 17, 19, 25 and 28, 2011 by Victor Gonzalez, Robert Steller and Charles Carter of **GEOVision**. Data analysis and report preparation was performed by Robert Steller and reviewed by John Diehl of **GEOVision**. The work was performed for ARUP, under subcontract with Gregg Drilling & Testing, Inc. (Gregg). Chris Christensen served as the point of contact for Gregg and Brandon Kluzniak served as the point of contact for ARUP.

This report describes the field measurements, data analysis, and results of this work.

SCOPE OF WORK

This report presents the results of boring geophysical measurements collected on October 17, 19, 25 and 28, 2011, in four uncased borings, as detailed below. The purpose of these studies was to supplement stratigraphic information obtained during ARUP's soil sampling program and to acquire shear wave velocities and compressional wave velocities as a function of depth.

BORING	DATES LOGGED	ELEVATION ⁽¹⁾ (NAVD88, FEET)	COORDINATES (FEET) ⁽¹⁾	
			NORTHING	EASTING
S0005R	10/17/2011	285.26	2,155,457.49	6,325,238.59
S0010R	10/19/2011	286.12	2,150,921.78	6,328,341.74
S0012R	10/25/2011	287.57	2,148,215.47	6,330,773.97
S0018R	10/28/2011	305.75	2,134,428.02	6,340,369.12

⁽¹⁾ Coordinates provided by ARUP

Table 1. Boring locations and logging dates

The OYO Suspension PS Logging System (Suspension System) was used to obtain in-situ horizontal shear (S_H) and compressional (P) wave velocity measurements at 1.6 foot intervals. Measurements followed **GEOVision** Procedure for P-S Suspension Seismic Velocity Logging, revision 1.5. The acquired data was analyzed and a profile of velocity versus depth was produced for both compressional and horizontally polarized shear waves.

A detailed reference for the suspension PS velocity measurement techniques used in this study is:

Guidelines for Determining Design Basis Ground Motions, Report TR-102293,
Electric Power Research Institute, Palo Alto, California, November 1993,
Sections 7 and 8.

INSTRUMENTATION

Suspension Instrumentation

Suspension soil velocity measurements were performed below the surface casing using the Suspension PS logging system, manufactured by OYO Corporation, and their subsidiary, Robertson Geologging. This system directly determines the average velocity of a 3.3-foot high segment of the soil column surrounding the boring of interest by measuring the elapsed time between arrivals of a wave propagating upward through the soil column. The receivers that detect the wave, and the source that generates the wave, are moved as a unit in the boring producing relatively constant amplitude signals at all depths.

The suspension system probe consists of a combined reversible polarity solenoid horizontal shear-wave source (S_H) and compressional-wave source (P), joined to two biaxial receivers by a flexible isolation cylinder, as shown in Figure 1. The separation of the two receivers is 3.3 feet, allowing average wave velocity in the region between the receivers to be determined by inversion of the wave travel time between the two receivers. The total length of the probe as used in these surveys is 21 feet, with the center point of the receiver pair 12.5 feet above the bottom end of the probe.

The probe receives control signals from, and sends the digitized receiver signals to, instrumentation on the surface via an armored 7 conductor cable. The cable is wound onto the drum of a winch and is used to support the probe. Cable travel is measured to provide probe depth data, using a 3.28-foot circumference sheave fitted with a digital rotary encoder.

The entire probe is suspended in the boring by the cable, therefore, source motion is not coupled directly to the boring walls; rather, the source motion creates a horizontally propagating impulsive pressure wave in the fluid filling the boring and surrounding the source. This pressure wave is converted to P and S_H -waves in the surrounding soil and rock as it impinges upon the wall of the boring. These waves propagate through the soil and rock surrounding the boring, in

turn causing a pressure wave to be generated in the fluid surrounding the receivers as the soil waves pass their location. Separation of the P and S_H -waves at the receivers is performed using the following steps:

1. Orientation of the horizontal receivers is maintained parallel to the axis of the source, maximizing the amplitude of the recorded S_H -wave signals.
2. At each depth, S_H -wave signals are recorded with the source actuated in opposite directions, producing S_H -wave signals of opposite polarity, providing a characteristic S_H -wave signature distinct from the P-wave signal.
3. The 7.0-foot separation of source and receiver 1 permits the P-wave signal to pass and damp significantly before the slower S_H -wave signal arrives at the receiver. In faster soils or rock, the isolation cylinder is extended to allow greater separation of the P- and S_H -wave signals.
4. In saturated soils, the received P-wave signal is typically of much higher frequency than the received S_H -wave signal, permitting additional separation of the two signals by low pass filtering.
5. Direct arrival of the original pressure pulse in the fluid is not detected at the receivers because the wavelength of the pressure pulse in fluid is significantly greater than the dimension of the fluid annulus surrounding the probe (meter versus centimeter scale), preventing significant energy transmission through the fluid medium.

In operation, a distinct, repeatable pattern of impulses is generated at each depth as follows:

1. The source is fired in one direction producing dominantly horizontal shear with some vertical compression, and the signals from the horizontal receivers situated parallel to the axis of motion of the source are recorded.
2. The source is fired again in the opposite direction and the horizontal receiver signals are recorded.
3. The source is fired again and the vertical receiver signals are recorded. The repeated source pattern facilitates the picking of the P and S_H -wave arrivals; reversal of the source changes the polarity of the S_H -wave pattern but not the P-wave pattern.

The data from each receiver during each source activation is recorded as a different channel on the recording system. The Suspension PS system has six channels (two simultaneous recording channels), each with a 1024 sample record. The recorded data are displayed as six channels with a common time scale. Data are stored on disk for further processing. Up to 8 sampling sequences can be summed to improve the signal to noise ratio of the signals.

Review of the displayed data on the recorder or computer screen allows the operator to set the gains, filters, delay time, pulse length (energy), sample rate, and summing number to optimize the quality of the data before recording. Verification of the calibration of the Suspension PS digital recorder is performed every twelve months using a NIST traceable frequency source and counter, as outlined in Appendix B.

MEASUREMENT PROCEDURES

Suspension Measurement Procedures

The borings were logged while filled with bentonite or polymer based drilling mud. Measurements followed the **GEOVision** Procedure for P-S Suspension Seismic Velocity Logging, revision 1.5. The probe was positioned with the mid-point of the receivers at ground level, and the depth value was set to zero, in order to reference all depths to ground level. The probe was lowered to the bottom of the boring, stopping at 1.6 foot intervals to collect data, as summarized in Table 2.

At each measurement depth the measurement sequence of two opposite horizontal records and one vertical record was performed, and the gains were adjusted as required. The data from each depth were viewed on the computer display, checked, and recorded on disk before moving to the next depth.

Upon completion of the measurements, the probe zero depth indication at the depth reference point was verified prior to removal from the boring.

BORING NUMBER	TOOL AND RUN NUMBER	DEPTH RANGE (FEET)	OPEN HOLE (FEET)	DEPTH TO BOTTOM OF CASING (FEET)	SAMPLE INTERVAL (FEET)	DATE LOGGED
S0005R	SUSPENSION 1	6.6 – 82.0	94.5	5	1.6	10/17/2011
S0010R	SUSPENSION 1	6.6 – 152.6	165.1	5	1.6	10/19/2011
S0012R	SUSPENSION 1	1.6 – 150.9	163.5	NONE	1.6	10/25/2011
S0018R	SUSPENSION 1	26.3 – 149.3	161.8	25	1.6	10/28/2011

- PROBE DID NOT TOUCH BOTTOM OF BORING

Table 2. Logging dates and depth ranges

DATA ANALYSIS

Suspension Analysis

Using the proprietary OYO program PSLOG.EXE version 1.0, the recorded digital waveforms were analyzed to locate the most prominent first minima, first maxima, or first break on the vertical axis records, indicating the arrival of P-wave energy. The difference in travel time between receiver 1 and receiver 2 (R1-R2) arrivals was used to calculate the P-wave velocity for that 3.3-foot segment of the soil column. When observable, P-wave arrivals on the horizontal axis records were used to verify the velocities determined from the vertical axis data. The time picks were then transferred into an EXCEL template (EXCEL version 2003 SP2) to complete the velocity calculations based upon the arrival time picks made in PSLOG.

The P-wave velocity over the 7.0-foot interval from source to receiver 1 (S-R1) was also picked using PSLOG, and calculated and plotted in EXCEL, for quality assurance of the velocity derived from the travel time between receivers. In this analysis, the depth values as recorded were increased by 5.2 feet to correspond to the mid-point of the 7.0-foot S-R1 interval. Travel times were obtained by picking the first break of the P-wave signal at receiver 1 and subtracting 4 milliseconds, the calculated and experimentally verified delay from source trigger pulse (beginning of record) to source impact. This delay corresponds to the duration of acceleration of the solenoid before impact.

As with the P-wave records, using PSLOG, the recorded digital waveforms were analyzed to locate the presence of clear S_H -wave pulses, as indicated by the presence of opposite polarity pulses on each pair of horizontal records. Ideally, the S_H -wave signals from the 'normal' and 'reverse' source pulses are very nearly inverted images of each other. Digital FFT - IFFT lowpass filtering was used to remove the higher frequency P-wave signal from the S_H -wave signal. Different filter cutoffs were used to separate P- and S_H -waves at different depths, ranging from 600 Hz in the slowest zones to 2000 Hz in the regions of highest velocity. At each

depth, the filter frequency was selected to be at least twice the fundamental frequency of the S_H -wave signal being filtered.

Generally, the first maxima were picked for the 'normal' signals and the first minima for the 'reverse' signals, although other points on the waveform were used if the first pulse was distorted. The absolute arrival time of the 'normal' and 'reverse' signals may vary by ± 0.2 milliseconds, due to differences in the actuation time of the solenoid source caused by constant mechanical bias in the source or by boring inclination. This variation does not affect the R1-R2 velocity determinations, as the differential time is measured between arrivals of waves created by the same source actuation. The final velocity value is the average of the values obtained from the 'normal' and 'reverse' source actuations.

As with the P-wave data, S_H -wave velocity calculated from the travel time over the 7.0-foot interval from source to receiver 1 was calculated and plotted for verification of the velocity derived from the travel time between receivers. In this analysis, the depth values were increased by 5.2 feet to correspond to the mid-point of the 7.0-foot S-R1 interval. Travel times were obtained by picking the first break of the S_H -wave signal at the near receiver and subtracting 4 milliseconds, the calculated and experimentally verified delay from the beginning of the record at the source trigger pulse to source impact. These data and analysis were reviewed by John Diehl as a component of **GEOVision's** in-house QA-QC program.

Figure 2 shows an example of R1 - R2 measurements on a sample filtered suspension record. In Figure 2, the time difference over the 3.3-foot interval of 1.88 milliseconds for the horizontal signals is equivalent to an S_H -wave velocity of 1745 feet/second. Whenever possible, time differences were determined from several phase points on the S_H -waveform records to verify the data obtained from the first arrival of the S_H -wave pulse. Figure 3 displays the same record before filtering of the S_H -waveform record with a 1400 Hz FFT - IFFT digital lowpass filter, illustrating the presence of higher frequency P-wave energy at the beginning of the record, and distortion of the lower frequency S_H -wave by residual P-wave signal.

RESULTS

Suspension Results

Suspension R1-R2 P- and S_H -wave velocities are plotted in Figures 4 through 7. The suspension velocity data presented in these figures are presented in Tables 3 through 6. These plots and data are included in the EXCEL analysis files accompanying this report.

P- and S_H -wave velocity data from R1-R2 analysis and quality assurance analysis of S-R1 data are plotted together in Figures A-1 through A-4 to aid in visual comparison. It should be noted that R1-R2 data are an average velocity over a 3.3-foot segment of the soil column; S-R1 data are an average over 7.0 feet, creating a significant smoothing relative to the R1-R2 plots. S-R1 data are presented in Tables A-1 through A-4, and included in the EXCEL analysis files.

Calibration procedures and records for the suspension PS measurement system are presented in Appendix B.

SUMMARY

Discussion of Suspension Results

Suspension PS velocity data are ideally collected in uncased fluid filled borings, drilled with rotary mud (rotary wash) methods. These borings were ideal for collection of suspension PS velocity data.

Suspension PS velocity data quality is judged based upon 5 criteria:

1. Consistent data between receiver to receiver (R1 – R2) and source to receiver (S – R1) data.
2. Consistent relationship between P-wave and S_H -wave (excluding transition to saturated soils)
3. Consistency between data from adjacent depth intervals.
4. Clarity of P-wave and S_H -wave onset, as well as damping of later oscillations.
5. Consistency of profile between adjacent borings, if available.

These data show good correlation between R1 – R2 and S – R1 data, as well as good correlation between P-wave and S_H -wave velocities. P-wave and S_H -wave onsets are generally clear, and later oscillations are well damped.

Quality Assurance

These boring geophysical measurements were performed using industry-standard or better methods for measurements and analyses. All work was performed under **GEOVision** quality assurance procedures, which include:

- Use of NIST-traceable calibrations, where applicable, for field and laboratory instrumentation
- Use of standard field data logs
- Use of independent verification of velocity data by comparison of receiver-to-receiver and source-to-receiver velocities
- Independent review of calculations and results by a registered professional engineer, geologist, or geophysicist.

Suspension Data Reliability

P- and S_H-wave velocity measurement using the Suspension Method gives average velocities over a 3.3-foot interval of depth. This high resolution results in the scatter of values shown in the graphs. Individual measurements are very reliable with estimated precision of +/- 5%. Standardized field procedures and quality assurance checks contribute to the reliability of these data.

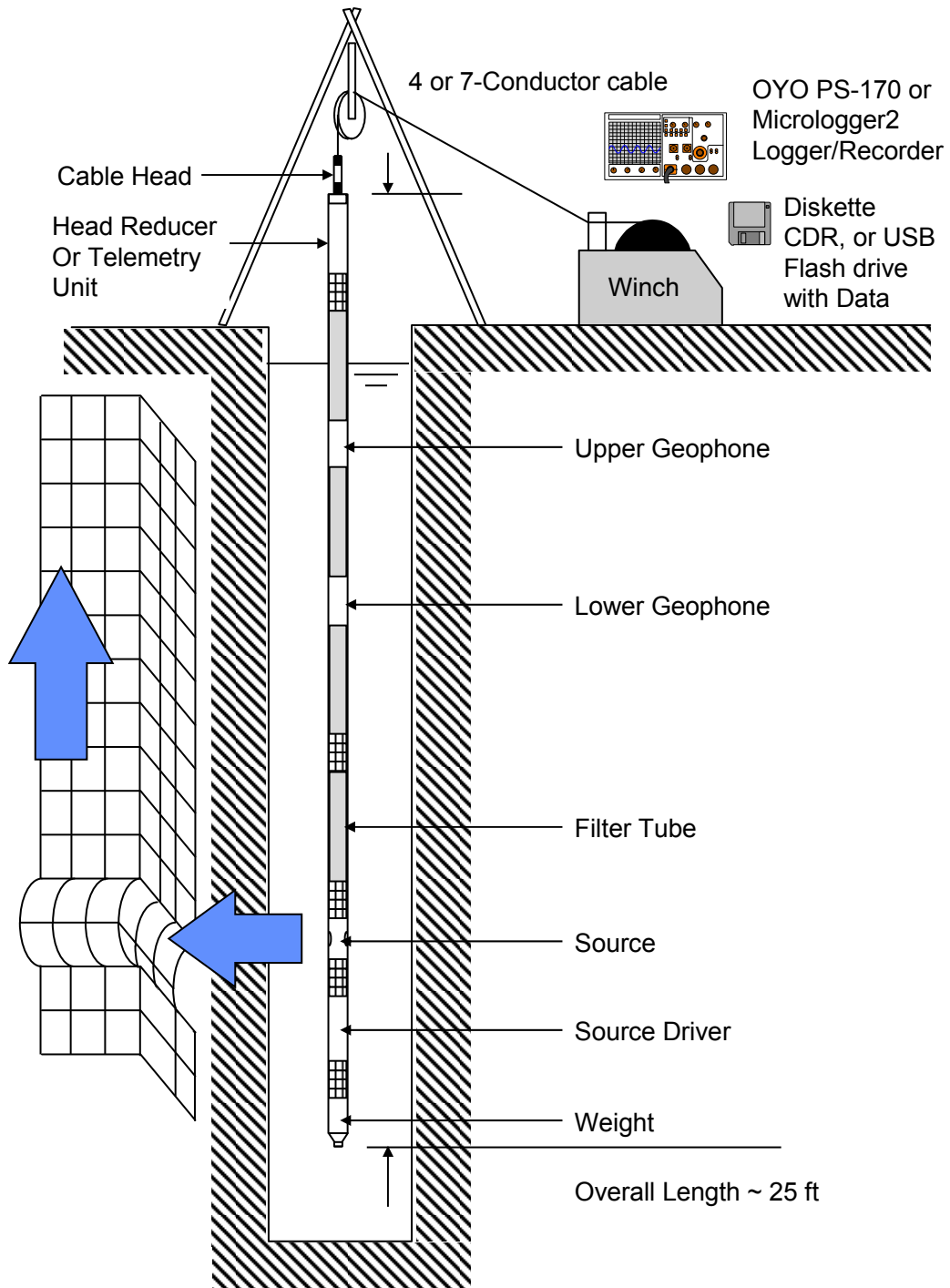


Figure 1: Concept illustration of P-S logging system

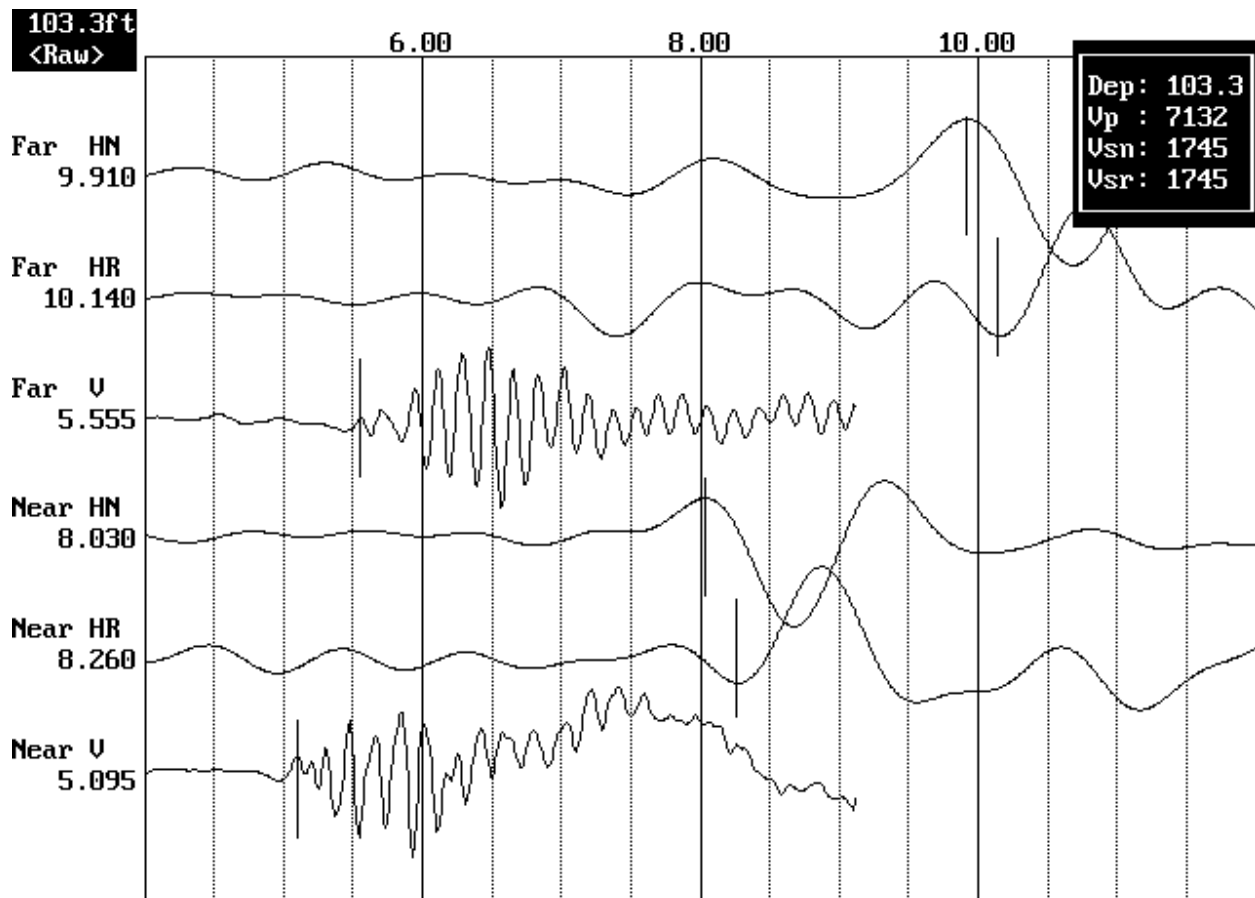


Figure 2: Example of filtered (1400 Hz lowpass) record

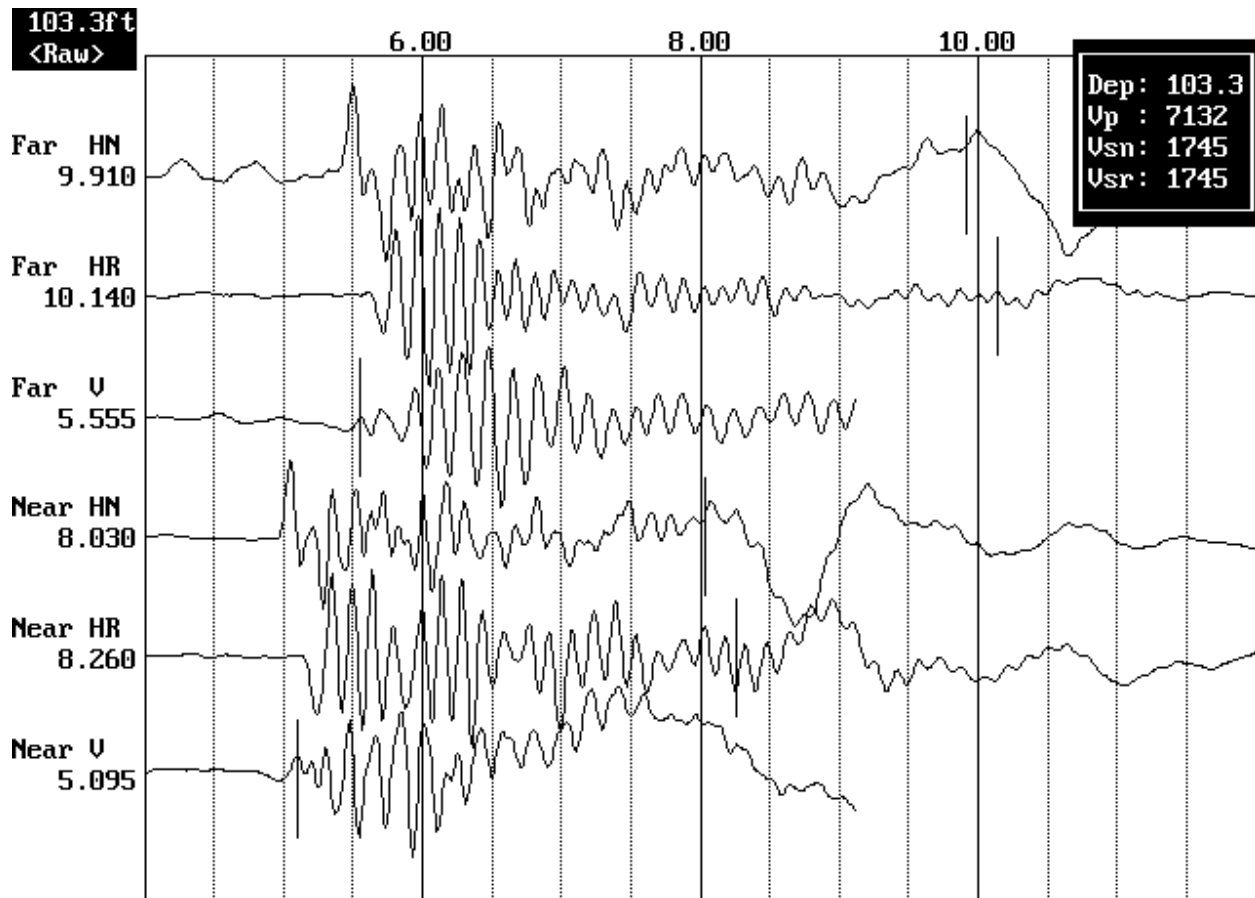


Figure 3. Example of unfiltered record

CALIFORNIA HIGH SPEED RAIL BORING S0005R **Receiver to Receiver V_s and V_p Analysis**

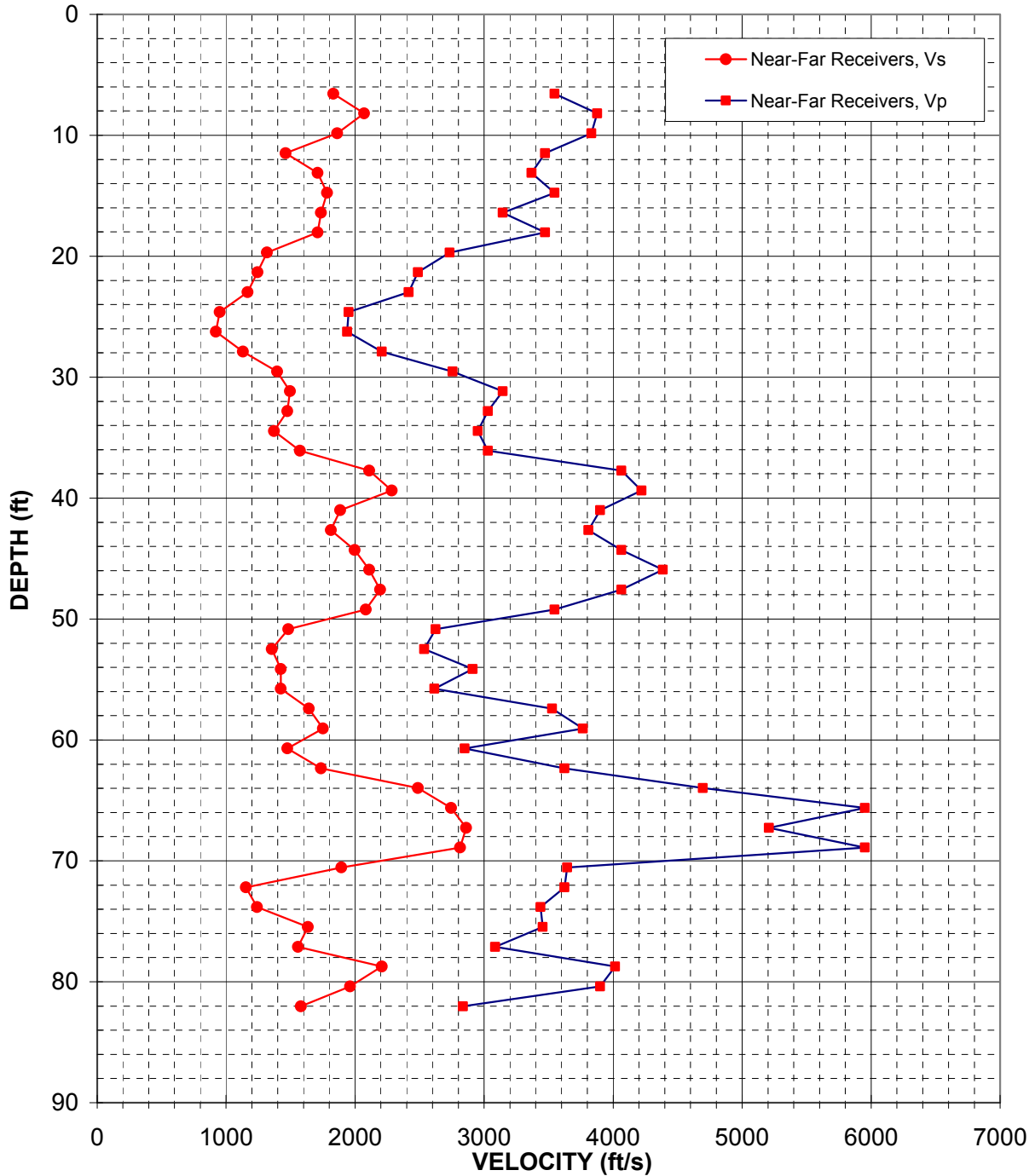


Figure 4: Boring S0005R, Suspension R1-R2 P- and S_H -wave velocities

Depth (feet)	V _s (feet/sec)	V _p (feet/sec)
6.6	1830	3550
8.2	2070	3880
9.8	1860	3830
11.5	1460	3470
13.1	1710	3370
14.8	1780	3550
16.4	1740	3140
18.0	1710	3470
19.7	1320	2730
21.3	1240	2490
23.0	1170	2420
24.6	950	1950
26.3	920	1940
27.9	1130	2210
29.5	1390	2750
31.2	1490	3140
32.8	1470	3030
34.5	1370	2950
36.1	1570	3030
37.7	2110	4070
39.4	2280	4220
41.0	1880	3900
42.7	1810	3810
44.3	2000	4070
45.9	2110	4390
47.6	2190	4070
49.2	2080	3550
50.9	1480	2620
52.5	1360	2530
54.1	1420	2910
55.8	1420	2610
57.4	1640	3530
59.1	1750	3770
60.7	1470	2850
62.3	1740	3620
64.0	2490	4690
65.6	2740	5950
67.3	2860	5210
68.9	2810	5950
70.5	1890	3640
72.2	1150	3620
73.8	1240	3440
75.5	1630	3450
77.1	1560	3090
78.7	2210	4020
80.4	1960	3900
82.0	1580	2840

Table 3. Boring S0005R, Suspension R1-R2 depths and P- and S_H-wave velocities

CALIFORNIA HIGH SPEED RAIL BORING S0010R **Receiver to Receiver V_s and V_p Analysis**

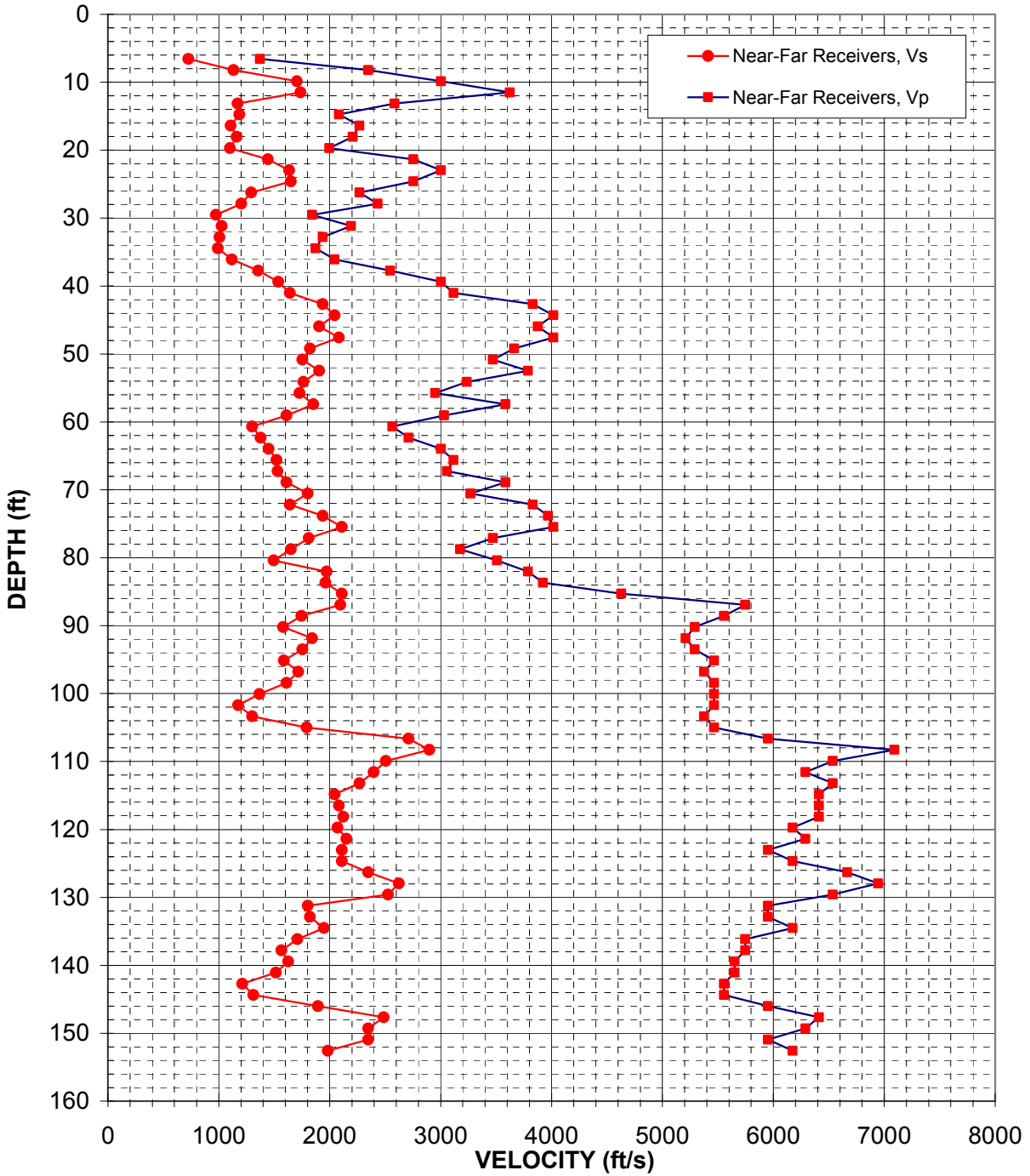


Figure 5: Boring S0010R, Suspension R1-R2 P- and S_H -wave velocities

Depth (feet)	V _s (feet/sec)	V _p (feet/sec)	Depth (feet)	V _s (feet/sec)	V _p (feet/sec)
6.6	720	1370	88.6	1750	5560
8.2	1130	2350	90.2	1580	5290
9.8	1710	3000	91.9	1840	5210
11.5	1740	3620	93.5	1750	5290
13.1	1170	2580	95.1	1590	5460
14.8	1190	2080	96.8	1720	5380
16.4	1110	2270	98.4	1610	5460
18.0	1160	2210	100.1	1370	5460
19.7	1100	2000	101.7	1170	5460
21.3	1440	2750	103.4	1300	5380
23.0	1630	3000	105.0	1790	5460
24.6	1650	2750	106.6	2710	5950
26.3	1290	2270	108.3	2900	7090
27.9	1200	2430	109.9	2510	6540
29.5	970	1840	111.6	2400	6290
31.2	1030	2190	113.2	2270	6540
32.8	1010	1940	114.8	2040	6410
34.5	990	1870	116.5	2080	6410
36.1	1120	2040	118.1	2120	6410
37.7	1360	2540	119.8	2070	6170
39.4	1540	3000	121.4	2150	6290
41.0	1640	3120	123.0	2110	5950
42.7	1940	3830	124.7	2110	6170
44.3	2040	4020	126.3	2350	6670
45.9	1900	3880	128.0	2620	6940
47.6	2080	4020	129.6	2530	6540
49.2	1820	3660	131.2	1800	5950
50.9	1750	3470	132.9	1820	5950
52.5	1900	3790	134.5	1950	6170
54.1	1760	3240	136.2	1710	5750
55.8	1730	2950	137.8	1560	5750
57.4	1850	3580	139.4	1630	5650
59.1	1610	3030	141.1	1520	5650
60.7	1300	2560	142.7	1210	5560
62.3	1380	2710	144.4	1310	5560
64.0	1450	3000	146.0	1890	5950
65.6	1520	3120	147.6	2490	6410
67.3	1530	3060	149.3	2350	6290
68.9	1610	3580	150.9	2350	5950
70.5	1800	3270	152.6	1980	6170
72.2	1640	3830			
73.8	1940	3970			
75.5	2110	4020			
77.1	1810	3470			
78.7	1650	3170			
80.4	1490	3510			
82.0	1970	3790			
83.7	1960	3920			
85.3	2110	4630			
86.9	2100	5750			

Table 4. Boring S0010R, Suspension R1-R2 depths and P- and S_H-wave velocities

CALIFORNIA HIGH SPEED RAIL BORING S0012R **Receiver to Receiver V_s and V_p Analysis**

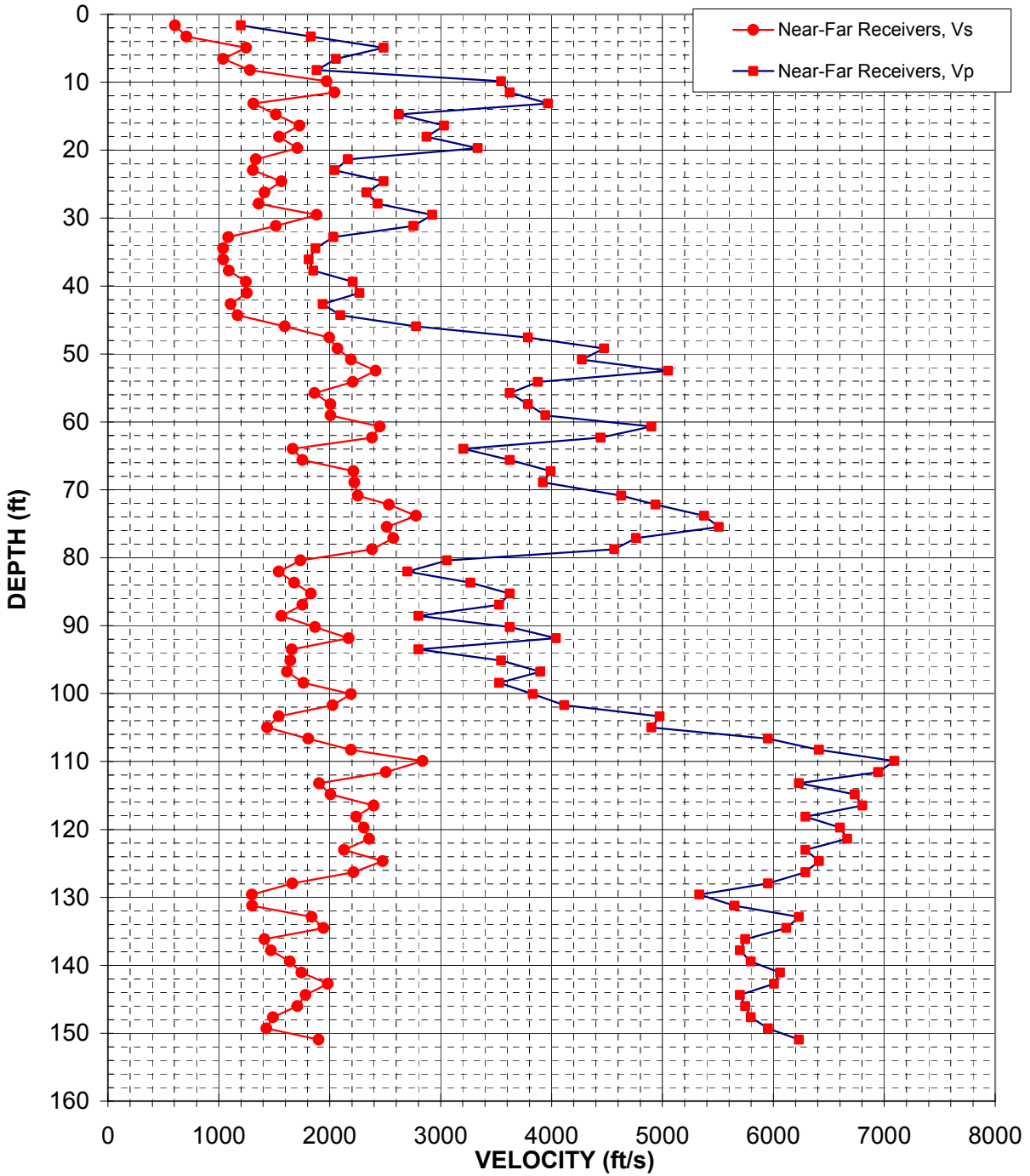


Figure 6: Boring S0012R, Suspension R1-R2 P- and S_H -wave velocities

Depth (feet)	V _s (feet/sec)	V _p (feet/sec)	Depth (feet)	V _s (feet/sec)	V _p (feet/sec)
1.6	610	1200	83.7	1680	3270
3.3	710	1830	85.3	1830	3620
4.9	1250	2490	86.9	1750	3530
6.6	1040	2060	88.6	1560	2800
8.2	1280	1880	90.2	1870	3620
9.8	1970	3550	91.9	2170	4040
11.5	2040	3620	93.5	1660	2800
13.1	1310	3970	95.1	1650	3550
14.8	1520	2620	96.8	1610	3900
16.4	1730	3030	98.4	1760	3530
18.0	1540	2870	100.1	2190	3830
19.7	1710	3330	101.7	2030	4120
21.3	1330	2160	103.4	1540	4980
23.0	1310	2040	105.0	1440	4900
24.6	1560	2490	106.6	1810	5950
26.3	1410	2330	108.3	2190	6410
27.9	1360	2430	109.9	2840	7090
29.5	1880	2920	111.6	2510	6940
31.2	1520	2750	113.2	1900	6230
32.8	1090	2030	114.8	2010	6730
34.5	1040	1870	116.5	2400	6800
36.1	1040	1810	118.1	2240	6290
37.7	1090	1850	119.8	2310	6600
39.4	1240	2210	121.4	2360	6670
41.0	1250	2270	123.0	2130	6290
42.7	1110	1940	124.7	2480	6410
44.3	1170	2100	126.3	2210	6290
45.9	1590	2780	128.0	1660	5950
47.6	2000	3790	129.6	1300	5330
49.2	2070	4470	131.2	1300	5650
50.9	2190	4270	132.9	1840	6230
52.5	2420	5050	134.5	1940	6120
54.1	2210	3880	136.2	1410	5750
55.8	1860	3620	137.8	1470	5700
57.4	2010	3790	139.4	1640	5800
59.1	2010	3940	141.1	1750	6060
60.7	2450	4900	142.7	1980	6010
62.3	2380	4440	144.4	1780	5700
64.0	1670	3210	146.0	1710	5750
65.6	1750	3620	147.6	1490	5800
67.3	2210	3990	149.3	1430	5950
68.9	2220	3920	150.9	1900	6230
70.9	2250	4630			
72.2	2530	4940			
73.8	2780	5380			
75.5	2520	5510			
77.1	2570	4760			
78.7	2380	4570			
80.4	1740	3060			
82.0	1540	2700			

Table 5. Boring S0012R, Suspension R1-R2 depths and P- and S_H-wave velocities

CALIFORNIA HIGH SPEED RAIL BORING S0018R **Receiver to Receiver V_s and V_p Analysis**

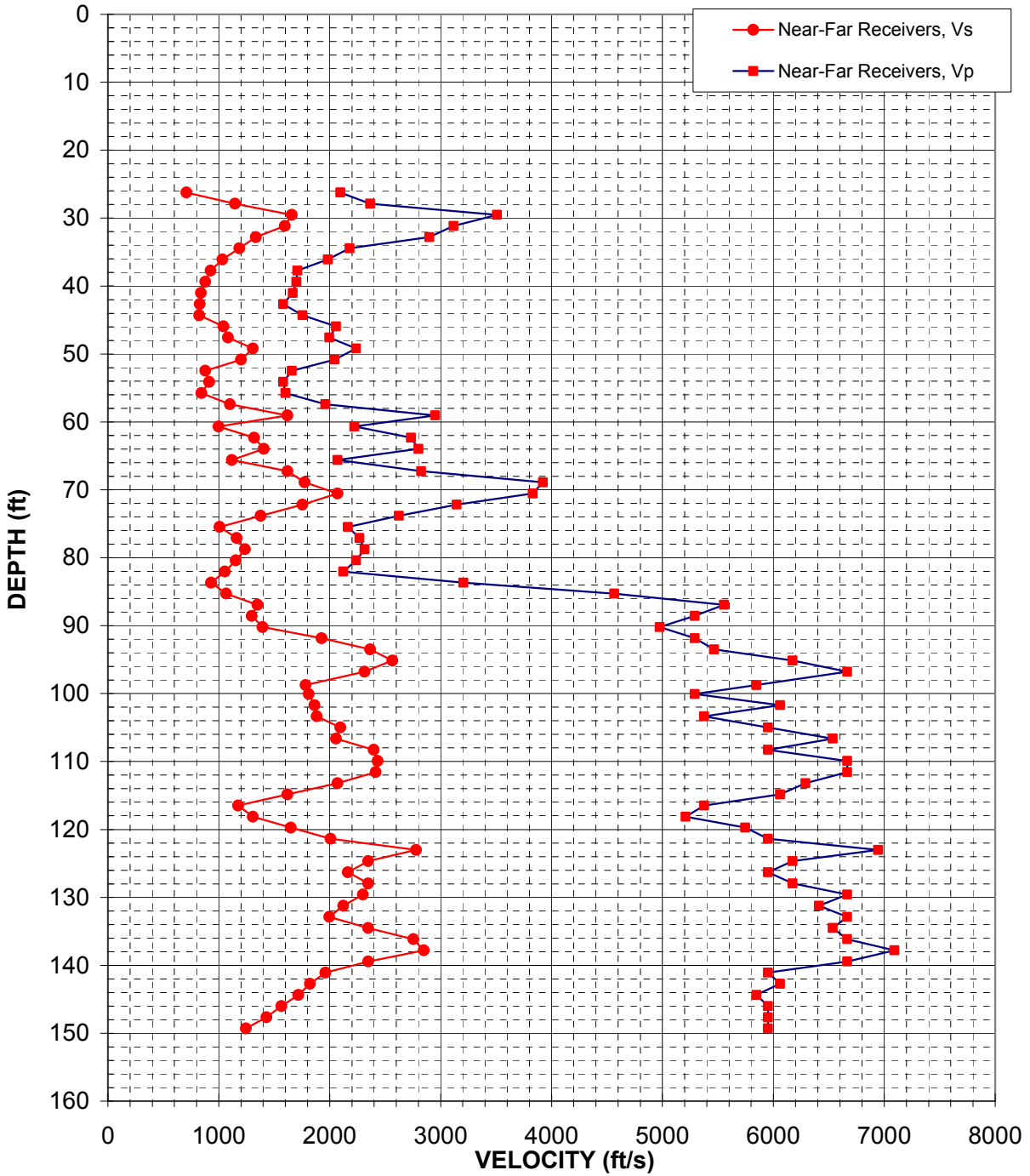


Figure 7: Boring S0018R, Suspension R1-R2 P- and S_H -wave velocities

Depth (feet)	V _s (feet/sec)	V _p (feet/sec)	Depth (feet)	V _s (feet/sec)	V _p (feet/sec)
26.3	710	2100	108.3	2400	5950
27.9	1150	2360	109.9	2430	6670
29.5	1660	3510	111.6	2420	6670
31.2	1590	3120	113.2	2070	6290
32.8	1330	2900	114.8	1620	6060
34.5	1190	2180	116.5	1170	5380
36.1	1030	1980	118.1	1310	5210
37.7	930	1710	119.8	1650	5750
39.4	880	1700	121.4	2010	5950
41.0	840	1670	123.0	2780	6940
42.7	830	1580	124.7	2350	6170
44.3	820	1750	126.3	2160	5950
45.9	1040	2060	128.0	2350	6170
47.6	1080	2000	129.6	2300	6670
49.2	1310	2240	131.2	2120	6410
50.9	1200	2040	132.9	2000	6670
52.5	880	1660	134.5	2350	6540
54.1	910	1580	136.2	2750	6670
55.8	840	1600	137.8	2850	7090
57.4	1100	1960	139.4	2350	6670
59.1	1620	2950	141.1	1960	5950
60.7	1000	2220	142.7	1820	6060
62.3	1320	2730	144.4	1720	5850
64.0	1410	2800	146.0	1560	5950
65.6	1120	2070	147.6	1430	5950
67.3	1620	2820	149.3	1240	5950
68.9	1770	3920			
70.5	2070	3830			
72.2	1750	3140			
73.8	1380	2620			
75.5	1010	2160			
77.1	1160	2270			
78.7	1230	2310			
80.4	1150	2240			
82.0	1050	2120			
83.7	930	3210			
85.3	1060	4570			
86.9	1350	5560			
88.6	1300	5290			
90.2	1390	4980			
91.9	1930	5290			
93.5	2360	5460			
95.1	2560	6170			
96.8	2310	6670			
98.8	1780	5850			
100.1	1810	5290			
101.7	1860	6060			
103.4	1880	5380			
105.0	2100	5950			
106.6	2060	6540			

Table 6. Boring S0018R, Suspension R1-R2 depths and P- and S_H-wave velocities

APPENDIX A

**SUSPENSION VELOCITY MEASUREMENT
QUALITY ASSURANCE SUSPENSION SOURCE
TO RECEIVER ANALYSIS RESULTS**

06/29/2012 ADDENDUM 3 - RFP HSR 11-16

CALIFORNIA HIGH SPEED RAIL BORING S0005R **Source to Receiver and Receiver to Receiver Analysis**

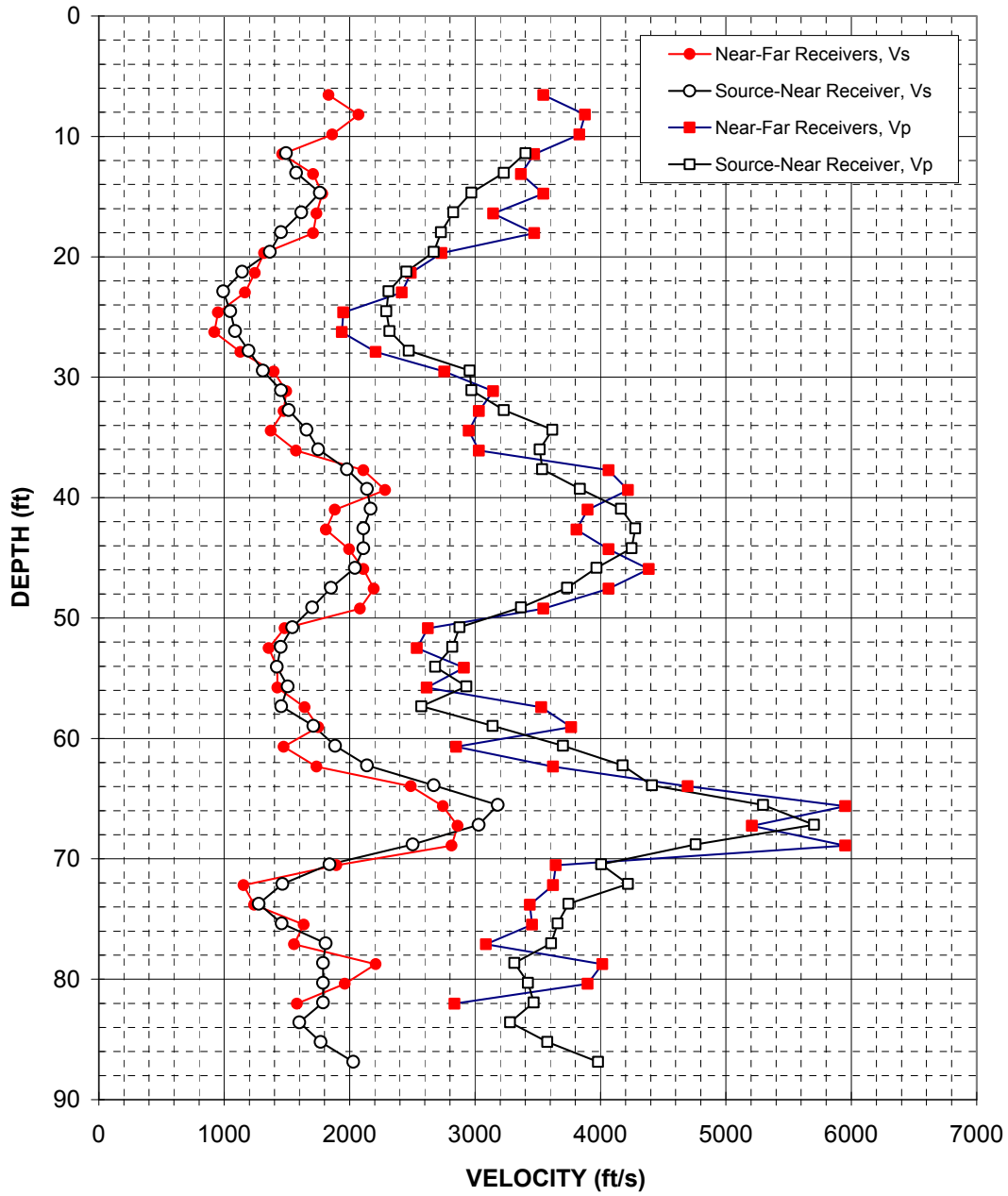


Figure A-1. Boring S0005R, R1 - R2 high resolution analysis and S - R1 quality assurance analysis P- and S_H -wave data

Depth (feet)	V _s (feet/sec)	V _p (feet/sec)
11.4	1490	3400
13.0	1570	3230
14.7	1760	2970
16.3	1610	2830
18.0	1450	2730
19.6	1360	2670
21.2	1140	2450
22.9	990	2310
24.5	1050	2290
26.2	1090	2320
27.8	1190	2470
29.4	1310	2960
31.1	1450	2970
32.7	1510	3230
34.4	1660	3620
36.0	1750	3520
37.6	1980	3540
39.3	2140	3840
40.9	2170	4160
42.6	2110	4280
44.2	2110	4250
45.8	2040	3970
47.5	1850	3730
49.1	1700	3370
50.8	1540	2880
52.4	1450	2820
54.0	1420	2680
55.7	1510	2930
57.3	1460	2570
59.0	1710	3140
60.6	1880	3700
62.2	2140	4180
63.9	2670	4410
65.5	3180	5300
67.2	3030	5700
68.8	2500	4760
70.5	1840	4010
72.1	1470	4220
73.7	1280	3750
75.4	1460	3660
77.0	1810	3610
78.7	1790	3310
80.3	1790	3420
81.9	1790	3470
83.6	1600	3280
85.2	1770	3580
86.9	2030	3980

Table A-1. Boring S0005R, S - R1 quality assurance analysis P- and S_H-wave data

CALIFORNIA HIGH SPEED RAIL BORING S0010R **Source to Receiver and Receiver to Receiver Analysis**

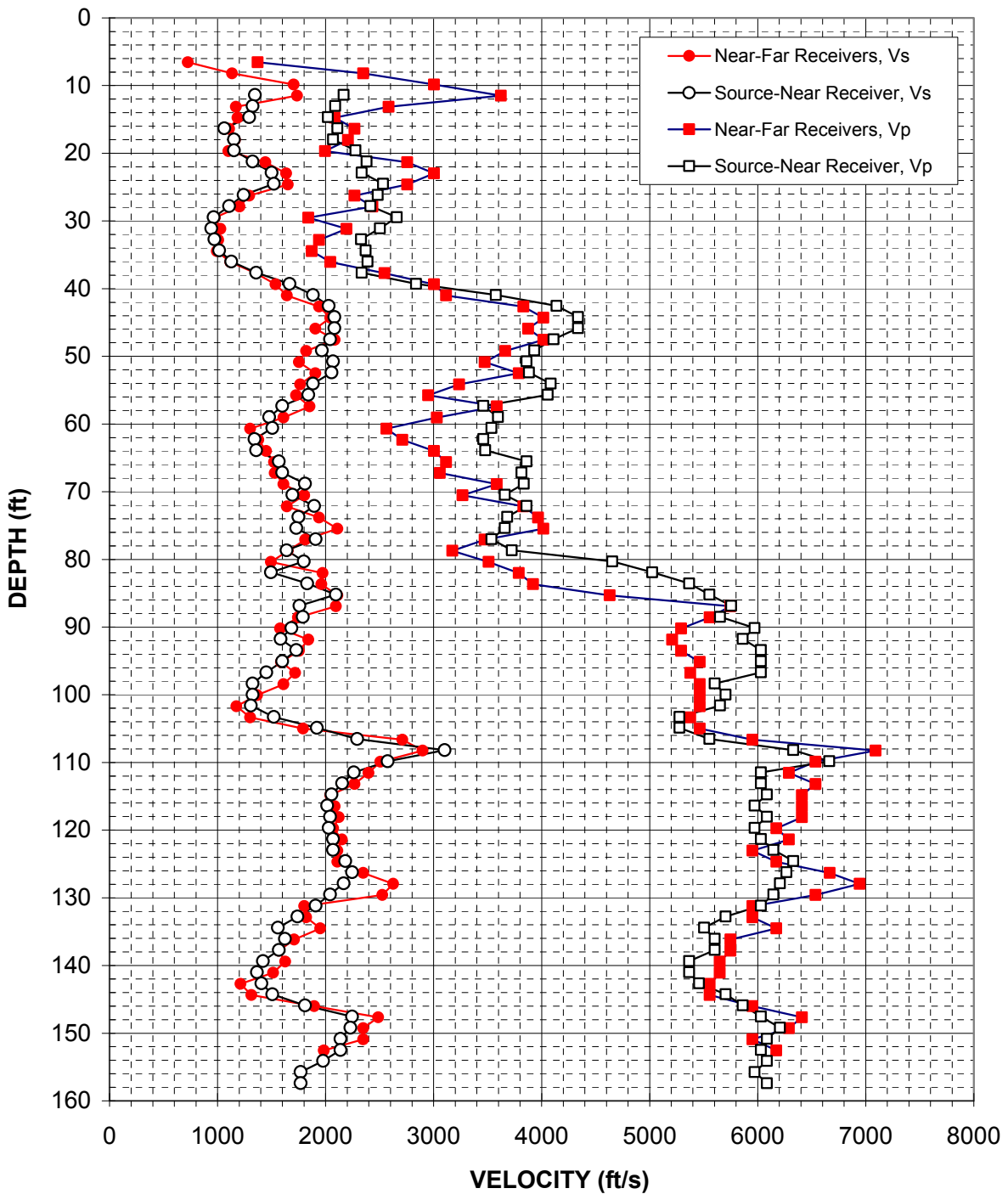


Figure A-2. Boring S0010R, R1 - R2 high resolution analysis
 and S - R1 quality assurance analysis P- and S_H-wave data

Depth (feet)	V _s (feet/sec)	V _p (feet/sec)	Depth (feet)	V _s (feet/sec)	V _p (feet/sec)
11.4	1350	2170	93.4	1730	6030
13.0	1320	2090	95.1	1600	6030
14.7	1290	2020	96.7	1450	6030
16.3	1060	2110	98.3	1320	5600
18.0	1150	2070	100.0	1320	5700
19.6	1150	2280	101.6	1310	5650
21.2	1320	2380	103.3	1520	5280
22.9	1500	2340	104.9	1920	5280
24.5	1520	2530	106.5	2290	5550
26.2	1240	2480	108.2	3100	6330
27.8	1110	2420	109.8	2570	6660
29.4	960	2660	111.5	2260	6030
31.1	940	2500	113.1	2150	6030
32.7	970	2330	114.7	2060	6090
34.4	1010	2370	116.4	2020	5970
36.0	1130	2390	118.0	2040	6090
37.6	1360	2340	119.7	2030	5970
39.3	1670	2840	121.3	2070	6030
40.9	1880	3580	122.9	2070	6150
42.6	2030	4140	124.6	2180	6330
44.2	2080	4340	126.2	2240	6270
45.8	2080	4340	127.9	2170	6210
47.5	2040	4110	129.5	2040	6150
49.1	1970	3930	131.1	1910	6030
50.8	2070	3860	132.8	1740	5700
52.4	2060	3880	134.4	1560	5500
54.0	1880	4080	136.1	1620	5600
55.7	1840	4060	137.7	1570	5600
57.3	1600	3460	139.3	1420	5360
59.0	1480	3600	141.0	1360	5360
60.6	1510	3540	142.6	1410	5460
62.2	1340	3460	144.3	1510	5700
63.9	1360	3480	145.9	1810	5860
65.5	1570	3860	147.6	2240	6030
67.2	1600	3810	149.2	2230	6210
68.8	1810	3840	150.8	2140	6090
70.5	1690	3660	152.5	2140	6030
72.1	1900	3860	154.1	1980	6090
73.7	1750	3680	155.8	1770	5970
75.4	1730	3660	157.4	1770	6090
77.0	1910	3540			
78.7	1640	3720			
80.3	1800	4650			
81.9	1490	5020			
83.6	1830	5360			
85.2	2100	5550			
86.9	1760	5750			
88.5	1790	5650			
90.1	1680	5970			
91.8	1580	5860			

Table A-2. Boring S0010R, S - R1 quality assurance analysis P- and S_H-wave data

CALIFORNIA HIGH SPEED RAIL BORING S0012R **Source to Receiver and Receiver to Receiver Analysis**

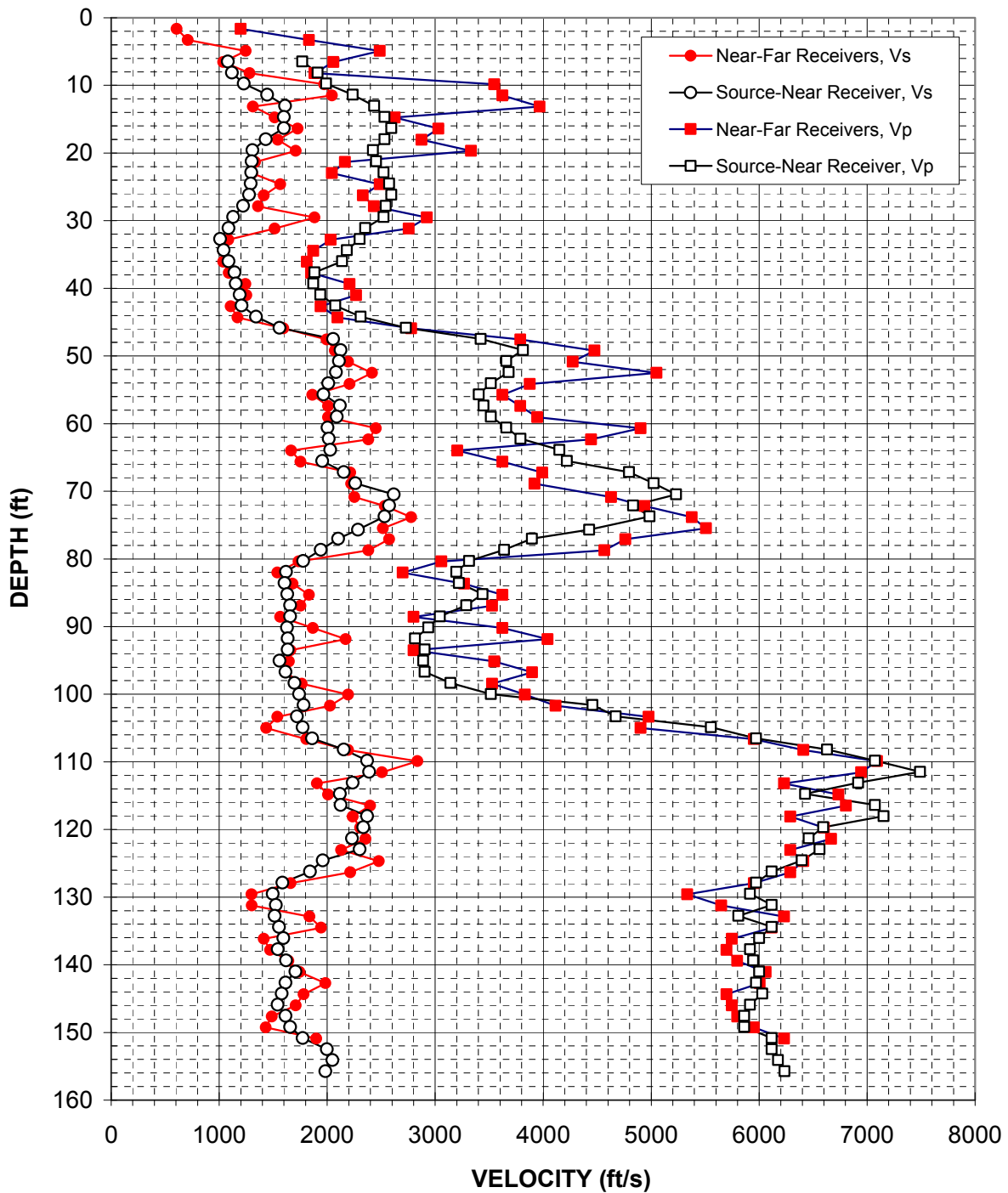


Figure A-3. Boring S0012R, R1 - R2 high resolution analysis and S - R1 quality assurance analysis P- and S_H -wave data

Depth (feet)	V _s (feet/sec)	V _p (feet/sec)	Depth (feet)	V _s (feet/sec)	V _p (feet/sec)
6.5	1080	1770	88.5	1660	3040
8.1	1120	1910	90.1	1630	2940
9.8	1230	1990	91.8	1640	2810
11.4	1450	2240	93.4	1640	2900
13.0	1610	2430	95.1	1560	2890
14.7	1600	2530	96.7	1610	2900
16.3	1600	2590	98.3	1700	3140
18.0	1430	2530	100.0	1740	3520
19.6	1310	2430	101.6	1780	4460
21.2	1300	2450	103.3	1720	4670
22.9	1300	2520	104.9	1770	5550
24.5	1290	2570	106.5	1860	5970
26.2	1280	2590	108.2	2150	6630
27.8	1220	2540	109.8	2370	7070
29.4	1130	2520	111.5	2390	7490
31.1	1090	2350	113.1	2240	6920
32.7	1010	2300	114.7	2120	6430
34.4	1040	2180	116.4	2120	7070
36.0	1090	2140	118.0	2370	7150
37.6	1140	1880	119.7	2340	6590
39.3	1160	1870	121.3	2230	6460
40.9	1190	1940	122.9	2300	6560
42.6	1210	2080	124.6	1960	6390
44.2	1340	2310	126.2	1840	6120
45.8	1560	2730	127.9	1590	5970
47.5	2060	3420	129.5	1500	5920
49.1	2120	3810	131.1	1530	6120
50.8	2110	3660	132.8	1510	5810
52.4	2080	3680	134.4	1560	6120
54.0	2010	3520	136.1	1590	6000
55.7	1970	3400	137.7	1540	5920
57.3	2120	3450	139.3	1620	5940
59.0	2090	3520	141.0	1710	6000
60.6	2000	3660	142.6	1610	5970
62.2	2020	3790	144.3	1580	6030
63.9	2030	4150	145.9	1540	5920
65.5	1950	4220	147.6	1610	5860
67.2	2150	4800	149.2	1660	5860
68.8	2260	5020	150.8	1770	6120
70.5	2620	5230	152.5	2000	6120
72.1	2570	4830	154.1	2050	6180
73.7	2530	4980	155.8	1980	6240
75.7	2290	4430			
77.0	2100	3900			
78.7	1940	3640			
80.3	1780	3310			
81.9	1620	3200			
83.6	1610	3220			
85.2	1630	3440			
86.9	1660	3290			

Table A-3. Boring S0012R, S - R1 quality assurance analysis P- and S_H-wave data

CALIFORNIA HIGH SPEED RAIL BORING S0018R **Source to Receiver and Receiver to Receiver Analysis**

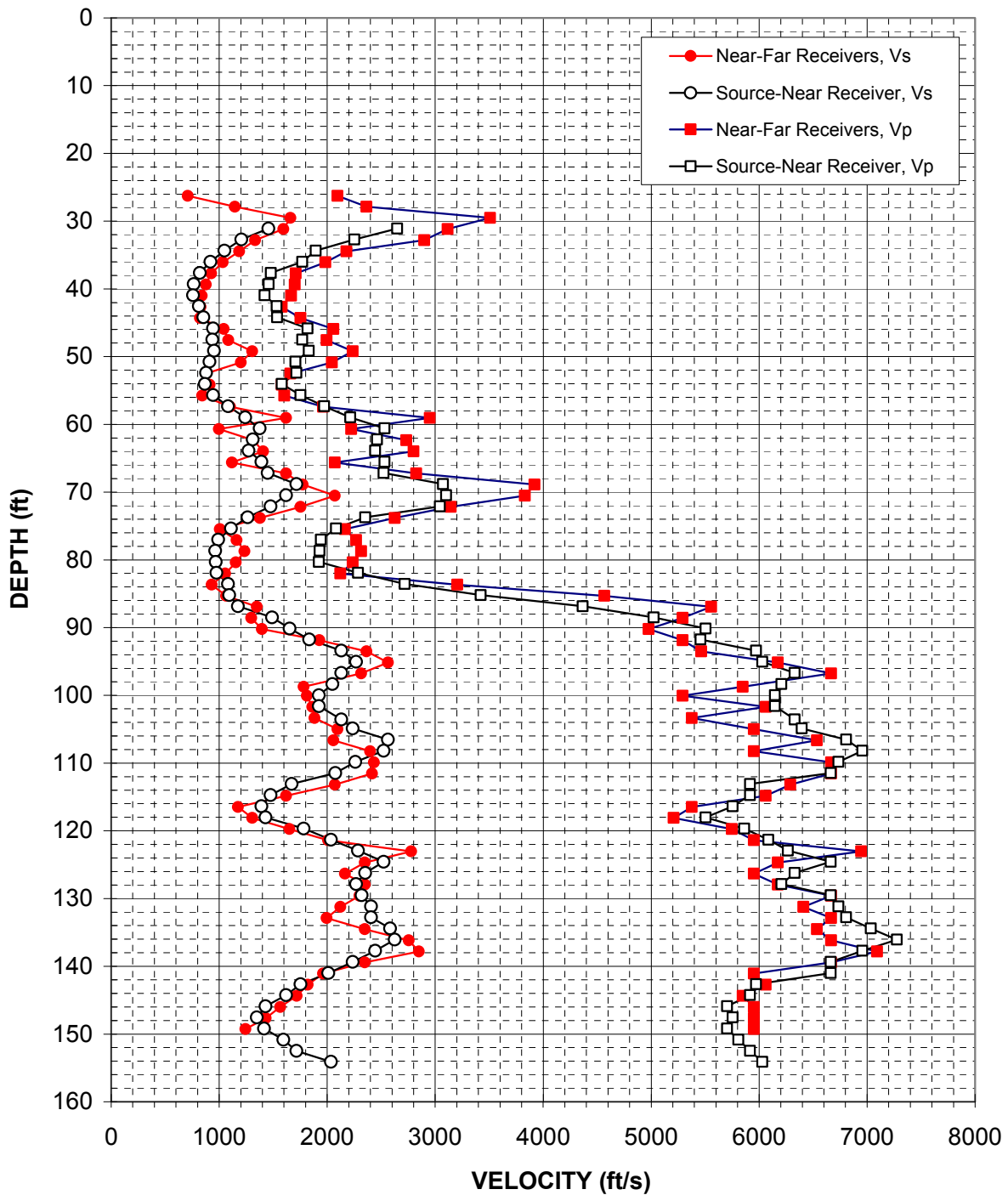


Figure A-4. Boring S0018R, R1 - R2 high resolution analysis
 and S - R1 quality assurance analysis P- and S_H -wave data

Depth (feet)	V _s (feet/sec)	V _p (feet/sec)	Depth (feet)	V _s (feet/sec)	V _p (feet/sec)
31.1	1460	2650	113.1	1670	5920
32.7	1210	2250	114.7	1480	5920
34.4	1050	1900	116.4	1390	5750
36.0	920	1770	118.0	1430	5500
37.6	820	1480	119.7	1780	5860
39.3	760	1460	121.3	2040	6090
40.9	760	1420	122.9	2290	6270
42.6	810	1530	124.6	2520	6660
44.2	860	1540	126.2	2350	6330
45.8	940	1820	127.9	2270	6210
47.5	940	1770	129.5	2320	6660
49.1	950	1830	131.1	2410	6730
50.8	910	1710	132.8	2410	6810
52.4	880	1720	134.4	2580	7030
54.0	870	1580	136.1	2630	7280
55.7	940	1750	137.7	2440	6960
57.3	1080	1970	139.3	2240	6660
59.0	1240	2210	141.0	2010	6660
60.6	1380	2530	142.6	1750	5970
62.2	1310	2460	144.3	1620	5920
63.9	1270	2440	145.9	1430	5700
65.5	1390	2530	147.6	1350	5750
67.2	1450	2520	149.2	1420	5700
68.8	1720	3070	150.8	1590	5810
70.5	1620	3100	152.5	1720	5920
72.1	1480	3040	154.1	2040	6030
73.7	1260	2350			
75.4	1110	2080			
77.0	990	1940			
78.7	960	1930			
80.3	970	1920			
81.9	980	2290			
83.6	1080	2720			
85.2	1090	3420			
86.9	1170	4370			
88.5	1490	5020			
90.1	1650	5500			
91.8	1830	5460			
93.4	2130	5970			
95.1	2270	6030			
96.7	2130	6330			
98.3	2050	6210			
100.0	1920	6150			
101.6	1920	6150			
103.6	2130	6330			
104.9	2240	6390			
106.5	2560	6810			
108.2	2520	6960			
109.8	2260	6730			
111.5	2080	6660			

Table A-4. Boring S0018R, S - R1 quality assurance analysis P- and S_H-wave data

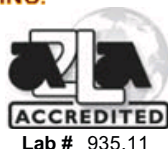
APPENDIX B

BORING GEOPHYSICAL LOGGING

SYSTEMS - NIST TRACEABLE

CALIBRATION RECORDS

06/29/2012 ADDENDUM 3 - RFP HSR 11-16



Certificate of Calibration

MICRO PRECISION CALIBRATION, INC.
12686 HOOVER STREET
GARDEN GROVE, CA, 92841
(714) 901-5659

Date: 8/8/2011

Lab # 935.11

Certificate #: 1462196

Customer:

GEOVISION
1124 OLYMPIC DRIVE
CORONA, CA, 92881

Purchase Order: BCHMPC2001001
Work Order: N/A

MPC Control #: BG9698
Asset ID: 15014
Gage Type: LOGGER
Manufacturer: OYO
Model Number: 03331-0000
Size: N/A
Temp./RH: 70 °F / 35 %

Serial Number: 15014
Department: N/A
Performed By: TYLER MCKEEN
Received Condition: IN TOLERANCE
Returned Condition: IN TOLERANCE
Cal Date: July 22, 2011
Cal. Interval: 12 MONTHS
Cal. Due Date: July 22, 2012

Found conditions meet or exceed manufacturer specifications.

*Calibration Notes:

This certificate supercedes 1443814.

See attached data sheet for calculations.

Calibrated IAW customer supplied calibration data form Rev 2.0

Test Points

Description	Standard	Tolerance -	Tolerance +	As Found	As Left	UOM	Result
Test Frequency	50.000	49.500	50.500	50.000	50.000	Hz	Pass
Test Frequency	100.000	99.000	101.000	100.000	100.000	Hz	Pass
Test Frequency	200.000	198.000	202.000	200.000	200.000	Hz	Pass
Test Frequency	500.000	495.000	505.000	500.000	500.000	Hz	Pass
Test Frequency	1000.000	990.000	1010.000	1000.000	1000.000	Hz	Pass
Test Frequency	2000.000	1980.000	2020.000	2000.000	2000.000	Hz	Pass

Standards Used To Calibrate Equipment

I.D.	Description	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
AM4000	WAVEFORM GENERATOR	33250A	MY40000703	AGILENT	8/17/2011	1063979
CC8501	GPS TIME & FREQUENCY RECEIVER	58503A	3710A08295	HEWLETT PACKARD	1/31/2013	1269299

Calibrating Technician:

TYLER MCKEEN

QC Approval:

Jim Williams

Unless Otherwise Noted, Uncertainty Estimated at ≥ 4 to 1. Uncertainties have been estimated at a 95 percent confidence level ($k=2$). Services rendered comply with ISO 17025:2005, ISO 9001:2008, ANSI/NCCL Z540-3, MPC Quality Manual, MPC CSD and with customer purchase order instructions.

Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. The information on this report, pertains only to the instrument identified.

All standards are traceable to the National Institute of Standards and Technology (NIST). Services rendered include proper manufacturer's service instructions and are warranted for no less than thirty (30) days. This report may not be reproduced in part or in whole without the prior written approval of the issuing MPC lab.



MICRO PRECISION CALIBRATION, INC.
12686 HOOVER STREET
GARDEN GROVE, CA, 92841
(714) 901-5659



Certificate of Calibration

Date: 8/8/2011

Lab # 935.11

Certificate #: 1462196

T1100

COUNTER

53131A

3546A09912

HEWLETT PACKARD

1/27/2012

1233372

Procedures Used In This Event:

Procedure Name	Description
CALIBRATION GENERAL	GENERAL CALIBRATION INSTRUCTION

Calibrating Technician:

TYLER MCKEEN

QC Approval:

Jim Williams

Unless Otherwise Noted, Uncertainty Estimated at ≥ 4 to 1. Uncertainties have been estimated at a 95 percent confidence level ($k=2$). Services rendered comply with ISO 17025:2005, ISO 9001:2008, ANSI/NCSL Z540-3, MPC Quality Manual, MPC CSD and with customer purchase order instructions.

Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. The information on this report, pertains only to the instrument identified.

All standards are traceable to the National Institute of Standards and Technology (NIST). Services rendered include proper manufacturer's service instructions and are warranted for no less than thirty (30) days. This report may not be reproduced in part or in whole without the prior written approval of the issuing MPC lab.

BG 9698



SUSPENSION PS SEISMIC LOGGER/RECORDER CALIBRATION DATA FORM

INSTRUMENT DATA

System mfg.:	OYO	Model no.:	3331
Serial no.:	15014	Calibration date:	7/22/2011
By:	Tyler McKeen	Due date:	7/22/2012
Counter mfg.:	Hewlett Packard	Model no.:	53131A
Serial no.:	3546A09912	Calibration date:	1/27/2011
By:	Micro Precision Calibration	Due date:	1/27/2012
Signal generator mfg.:	Hewlett Packard	Model no.:	33250A
Serial no.:	MY40000703	Calibration date:	8/17/2010
By:	Micro Precision Calibration	Due date:	8/17/2011

SYSTEM SETTINGS:

Gain:	20
Filter	LCF: 5Hz; HCF: 20kHz
Range:	See sample period in table below
Delay:	0 ms
Stack (1 std)	1
System date = correct date and time	7/22/2011 10:00

PROCEDURE:

Set sine wave frequency to target frequency with amplitude of approximately 0.25 volt peak

Note actual frequency on data form.

Set sample period and record data file to disk. Note file name on data form.

Pick duration of 9 cycles using PSLOG.EXE program, note duration on data form, and save as .sps file. Calculate average frequency for each channel pair and note on data form.

Average frequency must be within +/- 1% of actual frequency at all data points.

Maximum error ((AVG-ACT)/ACT*100)% As found 0.10% As left 0.10%

Target Frequency (Hz)	Actual Frequency (Hz)	Sample Period (microS)	File Name	Time for 9 cycles Hn (msec)	Average Frequency Hn (Hz)	Time for 9 cycles Hr (msec)	Average Frequency Hr (Hz)	Time for 9 cycles V (msec)	Average Frequency V (Hz)
50.00	50.000	200	401	180.0	50.00	180.0	50.00	180.0	50.00
100.0	100.00	100	402	90.00	100.0	90.00	100.0	90.00	100.0
200.0	200.00	50	403	45.00	200.0	44.95	200.2	45.00	200.0
500.0	500.00	20	404	17.98	500.6	18.00	500.0	18.00	500.0
1000	1000.0	10	405	9.000	1000	9.000	1000	9.000	1000
2000	2000.0	5	406	4.500	2000	4.505	1998	4.500	2000

Calibrated by:	Tyler McKeen	7/22/2011	
	Name	Date	Signature
Witnessed by:	Robert Steller	7/22/2011	
	Name	Date	Signature

Suspension PS Seismic Recorder/Logger Calibration Data Form Rev 2.0 July 21, 2008

06/29/2012 ADDENDUM 3 - RFP HSR 11-16